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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR MAY 1939

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ADMINISTRATION

Bisset Retires

Peter Bisset, senior horticulturist in charge of the Washington Inspection House, retired on April 30, 1939. Mr. Bisset entered Government service in 1909, when he accepted an appointment in the Office of Plant Introduction, Bureau of Plant Industry, and was placed in charge of the plant distribution of that office under David Fairchild. On July 1, 1926, he transferred to the Federal Horticultural Board as horticulturist in charge of the plant-inspection house, where he has rendered invaluable service to importers of plants. Mr. Bisset is one of the Nation's outstanding figures in the development of American horticulture and many letters of commendation from prominent nurserymen, botanists, and horticultural leaders of the country attest to his abundant knowledge and his expert handling of a wide variety of rare and valuable plant importations. He received his early training in Scotland and the superior knowledge of the care of plants, received in that country, served as an excellent background for the responsible position which he held for so many years.

Supplemental Grasshopper Appropriation

The funds available to the Bureau for cooperation with States and local agencies to control grasshopper outbreaks were so depleted on June 6 that it was necessary to advise cooperating States that the Bureau would be unable to continue with the cooperative program then underway after June 10. A supplemental estimate which would provide $1,750,000 was approved by the President on June 10 and this amount was appropriated by Joint Resolution passed by both Houses of Congress on June 12. Following this action instructions were sent to the field to resume the cooperative program at full speed. The situation regarding the grasshopper outbreak is acute, particularly so in the Northern Plains States, where the lesser migratory hopper is occurring in tremendous numbers, and migrations which may originate in the publicly owned and uninhabited depleted range lands threaten the cultivated crops in wide areas.

FRUIT INSECT INVESTIGATIONS

Headquarters for subtropical fruit insect investigations moved.--On May 10 the headquarters for the work on citrus and other subtropical fruit insects, located for a number of years at Orlando, Fla., was moved to St. Lucie, on the East Coast of Florida, near Fort Pierce. The investigations now underway at Orlando will be continued. The new location places the headquarters nearer to the Indian River section, where some of the work can be carried on to better advantage, and also nearer to certain crops other than citrus to which attention is being given. This work includes studies of the insects affecting papaya, avocado, mango, and pineapple. The new laboratory is located on the Indian River water front, about 3 miles north of Fort Pierce, and may be reached from Fort Pierce by taking U. S. Route No. 1 north to the town limits, then following State Road 140 north to St. Lucie Boulevard, east on the boulevard to the water front, and turning south to the third house. The post office address is Box 112, Fort Pierce, Fla., the telephone is Fort Pierce 183, the telegraph is Fort Pierce, and the express and freight address is U. S. Department of Agriculture, P. O. Box 112, Fort Pierce.

High catches of codling moths recorded in baits.--E. J. Newcomer reports that a combination of favorable conditions, including a week of warm weather and a test orchard in which there are an unusual number of codling moths, has resulted in record catches of moths in molasses baits at Yakima, Wash. Five baits operated in this orchard have caught 7,200 moths in 9 days, or an average of 160 moths per bait per day. The maximum number for 1 day for the 5 baits was 1,141 and 283 moths were caught on 2 successive nights in 1 bait. Other baits caught over 200 moths per night several times. The previous record was in 1928, when 558 moths were caught in 4 baits, including 209 in 1 bait in a single day.

Experiments with low-temperature control of dried-fruit insects.--Exploratory work with the use of low storage temperatures for the control of various insects in dried fruits has been reported by Perez Simmons, of the Fresno, Calif., laboratory. Apparently all saw-toothed grain beetles were killed by exposures of 4 hours or more to temperatures around 0° F. At temperatures of approximately 32°, 32 days or more was needed for complete mortality. All larvae of the raisin moth were killed by exposures of 8 hours at temperatures ranging from -4° down to -10°; a few survived 24-hour exposures to temperatures of about zero. At temperatures averaging about 32°, 85 days was needed for complete mortality, and at 35° to 38° some raisin moth larvae survived an exposure period of 100 days. Larvae of the Indian-meal moth were all killed by 24-hour exposures to temperatures from -10° up to 7.5°. At 31° to 33° complete mortality was obtained with a 65-day exposure, and similar results were obtained at 38° to 41°. There is evidence that the cold-hardiness of the insects depends to some extent upon the temperatures to which they were exposed before the experiments were started.

Emergence of grape leaf folder.--The progress of emergence of adult *Desmia funeralis* (Hbn.) from overwintered pupae was indicated by means of malt-sirup bait traps operated in 7 vineyards in Tulare and Fresno Counties, Calif. by Dwight F. Barnes and George H. Kaloostian of the Fresno, laboratory.

Collections were made twice weekly from 21 traps, 3 in each vineyard. The record is as follows:

Date	Adults emerged		Date	Adults emerged	
	Total	Per trap		Total	Per trap
April:	Number	Number	May:	Number	Number
4	1	0.01	2	227	3.46
7	59	.94	5	196	3.27
11	225	2.68	9	183	2.18
14	87	1.38	12	82	1.30
18	247	2.94	16	113	1.34
21	203	3.38	19	26	.41
25	205	2.44	23	19	.23
28	168	2.95	26	14	.22
			30	17	.20

First-brood larvae were observed in the field April 21, the first rolled leaves were seen May 1, and the first pupae on June 5.

MEXICAN FRUITFLY CONTROL

Record catch of flies in May.--The harvesting season for grapefruit picked for shipment came to a close at midnight of May 15. Such fruit as was actually harvested at that time was allowed to be sterilized and shipped. A few canneries operated until May 20 on fruit harvested for juicing only and for fruit that had been sterilized but failed to meet the grade requirements. This fruit was processed under contract for the Federal Surplus Commodities Corporation. Grove inspection in the regulated area resulted in the finding of 3 very light infestations in Valencia oranges. In Webb County 1 additional larval infestation was also found in grapefruit. The season's total of larval infestations to May 31 amounted to 2,129 within the regulated area and 9 outside of the regulated area. These last infestations were located as follows: Webb County, 7; Dimmit and La Salle Counties, 1 each. Traps in May took the largest number of flies for any 1 month since they have been operated. The total catch amounted to 4,970. This is more than twice as many as were trapped in February, when another record was broken. The tree-to-tree inspection for fruit missed by the harvesters was 95 percent complete on May 31. Some difficulty was encountered in obtaining the proper clean-up of abandoned and absentee-owned properties, but these groves amounted to a very small part of the total citrus planting.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Methyl bromide successful in mill fumigation.--R. T. Cotton, of the Manhattan, Kans., laboratory, says that methyl bromide was recently used to fumigate a small flour mill in Chicago, Ill. The fumigant was introduced into the machinery by means of a piping system. An excellent kill was obtained of insects planted in the milling units, although the dosage of 8.8 ounces per 1,000 cubic feet of space was not sufficient to kill insects outside the machinery.

Eight species of aegilops as new hosts of hessian fly.--According to Elmer T. Jones, Manhattan, nine species of *Aegilops* of hitherto unknown reaction to hessian fly development have been tested as possible fly hosts. In these tests appreciable infestations of puparia have been found to develop on *Aegilops comosa*, *A. speltoides*, *A. ligustica*, *A. umbellulata*, *A. aucheri*, *A. variabilis*, and *A. sharonensis*. Species are given in ascending order of infestation. Percentage of plants infested ranged from 30 percent for *A. comosa* to 80 percent for *A. sharonensis*. One species, *A. caudata*, was found to be entirely resistant to infestation.

F_2 wheat hybrids resistant to hessian fly in fall tests.--Mr. Jones, Manhattan, also reports that recent computation of fall infestation records obtained in the Springfield, Mo., fly tests show 8 F_2 populations of wheat hybrids in 63 rows to possess promise for resistance. The average plant infestation for the hybrids (all with fly resistance from spring wheat) was 36 percent, as against average infestations of 1.7 percent for all resistant and 86 percent for all susceptible checks of the parental strains. Infestations of populations of 6 crosses in which only 1 resistant plant was involved ranged from 25 to 51 percent, while populations of crosses with 2 resistant parents (Marquillo x Oro) x Marvel and (Marquillo x Oro) x Illinois No. 1 B38 averaged, respectively, 5 percent and 11 percent plants infested. Crosses tested involved Oro, Oro x Tenmarq, and Clarkan x Kawvale as susceptible and Marquillo x Tenmarq, Marquillo x Oro, Illinois No. 1 B38, IV Cl + #, Renacimiento, and Marvel as resistant parentals.

Range grasshoppers trapped with tin barriers.--F. A. Morton, Bozeman, Mont., states that migrating nymphs of the long-winged migratory grasshopper of the Great Plains (*Dissosteira longipennis* Thos.) can be easily trapped with galvanized tin barriers similar to those used in Mormon cricket control. In June 1938, two 100-foot lengths of 10-inch barrier were set up to form a V, with the apex leading over a dirt ramp into a small pen. In 2½ hours 60 gallons of 4th- and 5th-instar nymphs were trapped.

Grasshoppers versus cows as feeders.--Mr. Morton conducted experiments in 1936, 1937, and 1938 to determine the quantity of grass eaten by known numbers of range grasshoppers. From these experiments it was determined that 301,395 grasshoppers destroy enough vegetation to maintain an average-size cow on minimum feed. Where a cow requires 3 acres per month for subsistence rations, a population of 24 adult grasshoppers per square meter would consume all the feed and leave nothing for the cow.

Desiccation of Mormon cricket eggs reduces viability.--Frank T. Cowan and H. J. Shipman, Bozeman report that Mormon cricket eggs that have lost 25 percent of their moisture never give more than a 50 percent hatch when remoistened. When the moisture content was reduced 50 percent no eggs hatched. This indicates that dry weather late in the summer and fall may be an important factor in checking Mormon cricket outbreaks.

Second-generation tendency of European corn borer in Lake States.--A. M. Vance, Toledo, Ohio, reports considerable variation in the tendency of the European corn borer to produce a second generation, without diapause, in material collected from different fields in Michigan, Ohio, and Indiana, as indicated by the proportion of pupation observed. Corn borer larvae from 31 fields selected at random were collected in October 1938, overwintered in cold storage, and forced to produce moths in March and April 1939. Rearings were made from the eggs of the F_1 generation thus procured under constant food and developmental conditions, and pupation was calculated at the end of a 40-day period. Each collection lot averaged 70 individuals. The percentages of pupating larvae were as follows: In 13 collections from Monroe and Wayne Counties, Mich.: 0, 0, 0, 0, 0, 1.1, 1.2, 1.6, 4.2, 4.4, 4.9, 5.3, and 17.8; in 16 collections from Lucas, Ottawa, Sandusky, and Erie Counties, Ohio: 0, 0, 2.1, 3.6, 5, 5.6, 7.7, 7.9, 25.5, 28.3, 36.4, 39.8, 41.5, 56.5, 67.6 and 69.4; in 1 collection from Logan County, Ohio: 15.8; and in 1 collection from Steuben County, Ind.: 0. No pupation occurred in 8, or 25.8 percent, of the 31 collections. The 3 lots of larvae exhibiting the highest pupation (each over 50 percent) were progeny of collections from near Huron, Erie County, Ohio. Less pupation occurred among the Michigan than among the Ohio larvae but, in general, the differences in the second-generation tendency were observed mainly as field-to-field variation, indicative of heterogeneity in the physiological condition of the corn borer at present in the region studied.

Status of European corn borer parasites in Eastern States at close of 1938.--C. A. Clark, Moorestown, N. J., reports as follows on the parasites of *Pyrausta nubilalis* Hbn. in the Eastern States: A total of 20,312 corn borer larvae, collected in the Eastern States area at the close of 1938, were reared in February and March 1939 to supply data on the field status of parasites there. *Lydella grisescens* R. D. was very scarce in the Malden, Mass., area. In the Taunton, Mass., area, parasitization of 20 percent was recorded. *L. grisescens* had increased its distribution in 1938 at both Taunton, Mass., and East Hartford, Conn. This parasite was found to have maintained itself at Atlantic, N. J., but was not yet abundant. A great increase, both in dispersion and parasitization of the borer by *L. grisescens*, occurred in the Lee, Va., area. The survey here indicated that the tachinid was present over a territory in excess of 70 square miles and averaged 9.5-percent parasitization in the fall of 1938, as compared to only 0.6 percent in the fall of 1937. *Inareolata punctoria* Roman was important in the Malden area, with a recorded average parasitization of 12.7 percent and a maximum of 32.6 percent; in the Taunton area with a maximum of 10.7 percent; and in the East Hartford area with an average of 8.3 percent and a maximum of 28.3 percent. During 1938 the parasite increased in the Malden area and especially in the East Hartford area. *I. punctoria* was found over an area of only 15 square miles in the fall of 1937 at East Hartford, as compared to over 56 square miles in 1938. In the East Hartford section this parasite has constantly increased in distribution and parasitization of the borer since the parasite was first released here in 1934. *Macrocentrus gifuensis* Ashm. has increased spectacularly in range and parasitization in the Taunton, Mass., area. Its parasitization of the borer increased from a recorded average of 1.0 percent in the fall of 1937, to average 8.0 percent with a maximum of 56.3 percent recorded in the fall of 1938. The parasite had attacked over 20 percent of the corn borer larvae in numerous fields where collections were made in the fall of 1938. Since this polyembryonic species produces an average of over 20 adults per parasitized host, it was expected that many more parasite than host adults would be present in such fields of high parasitization this spring. This parasite was recovered at Burlington, N. J., where it was first released in 1938. The known area occupied by *Chelonus annulipes* Wesm. in the locality of Taunton was considerably increased, as shown by the 1938 fall survey. The parasite apparently had not increased its rate of parasitization there during 1938. *C. annulipes* was recovered in Burlington, N. J., following its release the same season but was not recovered at Lee, Va., from releases made in 1936 and 1937. *Cremastus flavoorbitalis* (Cameron) continues maintenance in the Taunton area but remains of no importance there. The native parasites, *Bassus agilis* Cress., *Labrorychus prismaticus* Nort., *Macrocentrus robustus* Mues., and *Amblyteles brevicinctor* (Say) were all recovered in the course of the 1938 fall survey but, as in past years, were found to be of little importance in control of the corn borer. The biotic resistance to the corn borer as a result of the introduction of exotic parasites has continued to increase in the Eastern States area. This is believed to have reached important proportions in the Malden and Taunton, Mass., East Hartford, Conn., and Lee, Va., areas. Parasitization is still increasing in most of these areas and establishment of some of the most promising exotic parasites in new localities is recorded for the first time following more recent releases.

Control of the entomogenous fungus Beauveria bassiana, infecting European corn borer larvae in the laboratory.--W. G. Bradley and D. D. Questel, Toledo, Ohio, report as follows on results of their observations to control infections of the entomogenous fungus *Beauveria bassiana* in full-grown European corn borer larvae being carried in the laboratory for parasite emergence and as a source of moths for various laboratory rearing programs: Phenylmercuric nitrate was tested at various dilutions in distilled water on disease cultures on potato-dextrose-agar media and on inoculated corn borer larvae when subjected to various conditions of exposure and development. Concentrations of the test solutions as high as 1-48,000 produced a toxic effect on mature corn borer larvae. Satisfactory control of the disease organism on culture media was not obtained with dilutions of the antiseptic of 1-192,000 or higher. An aqueous solution of phenylmercuric nitrate (basic) used at the dilution 1-96,000 appeared to be the most satisfactory antiseptic for controlling *B. bassiana*, with a minimum of toxicity to the treated larvae. Single spores in contact with the fungicide are killed by dilutions of 1-96,000, but conidia in masses or undisturbed from their globose conidiophores are difficult to wet and under such circumstances complete control is not certain. Phenylmercuric nitrate (1-96,000) is ineffective unless applied to the larvae within 24 hours following inoculation. Control of *B. bassiana* among larvae isolated in 2-inch vials appears practical by utilizing phenylmercuric nitrate (1-96,000) as a substitute for tap water for at least some of the necessary contact-moisture applications.

White grubs late in leaving hibernation quarters in southern Wisconsin.--T. R. Chamberlin, Lee Seaton, and J. A. Callenbach, Madison, Wis., report that digging in pastures in southern Wisconsin during the last 10 days in April indicated that practically all of the grubs were below the 10-inch level in the soil and that most of them were near the 15-inch level. Since 15 inches is approximately the depth at which most of the grubs have hibernated during the last few seasons, there has been apparently little upward movement thus far this season. As was expected, all grubs from the 1938 oviposition were of the second instar, the molting period for this stage normally beginning about the middle of June. A great deal of plowing was done at intervals during the last 2 weeks of April and it is doubtful if any of this has had any material effect upon the grub populations. At the end of the month an entirely different situation was observed in a lawn in Madison. This lawn was heavily infested with third-instar grubs, which were active and in the sod. Third-instar grubs at this time of the year ordinarily would be from beetles flying 2 years previously, in this case in 1937. Third-instar grubs occasionally have been observed to come to the upper levels of the soil in their third season and to feed for some time, but in this case the grubs resembled third instar in the second season rather than the third and the species concerned was for the most part Phyllophaga rugosa (Melsh.), which was very scarce in the 1937 flight. It seems possible, therefore, with a long feeding season in 1938 and an abundance of food in the lawn, that these grubs may have come from the 1938 oviposition and changed to third instar in the fall. The absence of second-instar grubs, the ones to be expected in greatest numbers, adds weight to this inference. An abundance of food for the grubs and opportunity for them to feed continuously seem to be among the most important conditions that have enabled us to rear in the laboratory beetles with a 3-year cycle in about 9 months' time. It does not seem unreasonable to suppose, therefore, that in longer feeding seasons with an abundance of food the life cycle may be accelerated in the field.

JAPANESE BEETLE CONTROL

Nursery shipping season ends in New England.--With the arrival of Memorial Day, the greater part of the spring nursery-inspection work was completed in the New England area. Only 1 of the 13 temporary inspectors employed in this work was retained after May 31. Throughout the area there were more shipments and a larger quantity of plants presented for inspection and certification than for several years. The hurricane of September 21, 1938, also caused an increased demand for stock for replacements, both inside and outside the gypsy moth infested area. At a forest nursery in western Maine it was necessary to make actual tree-by-tree inspection of 2,119,894 trees, consisting of 1,320,924 young evergreens, 798,405 seedlings, 480 shrubs, and 85 young deciduous trees. To cover these shipments 6,067 certificates were issued. This same nursery in 1938 presented for inspection a total of 989,645 trees. In western Maine the frost held in the ground until April 26, making it necessary to inspect over 2 million trees within a period of about 2 weeks at 1 establishment. In order to provide room for inspection, old railroad boxcars were used. These were on a spur track next to the packing house and were lighted by electricity. As fast as the trees were dug in the field they were delivered to these cars, inspected for gypsy moth egg clusters, and then transferred to the packing house. During 1 period an inspection crew of 12 men worked in 8-hour shifts for several consecutive days. Only 2 gypsy moth egg clusters were found in the entire lot of trees examined.

Brown-tail moth and tent caterpillar activity.--Brown-tail moth larvae were first noted emerging from their winter webs at Raymond, Maine, on May 10. Webbing of tent caterpillars in the New England area was first observed by district inspectors on April 25 in the Westfield, Mass., district. Other observations of the webbing of this species were made by districts as follows: Middletown, Conn., May 1; Concord, N. H., May 5; Westerly, R. I., and Barre, Vt., May 8; and Bangor, Maine, May 15. In 1938, tent caterpillar webbing was reported as early as April 14 in Massachusetts and April 18 in both Vermont and Maine.

Gypsy moth hatching dates.--Earliest observations of hatching of gypsy moth egg clusters were made in the town of Granville, Mass., on May 3. The first hatching in Rhode Island was recorded in the town of South Kingston on May 3. Fewer observations were made in Connecticut, where the first larvae were noted in the town of Killingly on May 11. On the latter date hatching also began in the town of Keene, N. H. Not until May 13 were newly hatched larvae seen in Maine. These were observed in the town of Fryeburg.

Dutch elm disease culture laboratory moved to Bloomfield.--The culture laboratory for Dutch elm disease and the apparatus required for culturing were removed from the Morristown, N. J., laboratory to especially constructed laboratory quarters at the Bloomfield, N. J., divisional field headquarters on May 8. Most of the necessary equipment was installed and in operating condition by that date. The culture laboratory will be maintained as a separate unit of the Division and not as a part of the New Jersey project work office. Four appointed men were transferred from Morristown to Bloomfield on May 15, and on the same date several security-wage workers were assigned as laboratory assistants, clerks, and laborers. The first media were poured into petri dishes at the new laboratory on May 16 and culturing was started on May 17. About 1,800 twig samples were accumulated for culturing during the 2 weeks required to transfer the laboratory equipment and set it up in Bloomfield.

Early elm-wilting symptoms.--The first definite signs of elm-foliage wilt, characteristic of Dutch elm disease infection, were observed on May 16 on a small elm being eradicated in the town of Greenwich, Conn. In Dutchess County, N. Y., during the same week another instance of early season wilt was reported, this being in a tree that was tagged in 1938. On May 26, two area foremen observed characteristic wilting on a tree located in Hillsborough Township, Somerset County, N. J., near the Sourland Mountains. Wilting was also observed late in the month on an elm tree located in Crugers Park, Putnam County, N. Y. It was a definite green wilt but did not show discoloration below the bark. The tree was not sampled but was left for further observation.

First-record Dutch elm disease infection.--In mid-May laboratory culturing of twig samples confirmed the presence of the Dutch elm disease fungus in an elm located in Buckingham Township, Bucks County, Pa. This township adjoins the townships of Wrightstown and Upper Makefield, where infections have been previously found. With Buckingham Township coming within the infected area, the boundary connecting the outermost points of infection moves west to Neshaminy Creek. This township adds 34.1 square miles to the infected zone, increasing the total square mileage in the State to 171.6; however, there are only 31 known cases of infection in this area.

Burning of elm logs banned in Connecticut.--During the second week in May the Connecticut State fire warden placed a ban on all ordinary burning, causing a considerable accumulation of wood piles. All field men were required to work on rainy days for the purpose of burning as many of these accumulated piles as possible. This ban was occasioned by the lack of rainfall during the month and the great fire hazard from the thousands of trees felled by the September hurricane.

Elm sanitation completed in swamp area.--By May 20, elm-sanitation work was completed in a large swamp in Patterson Township, Putnam County, N. Y. Over 10,000 elms of all sizes were removed from this 1,500-acre swamp. All elms within a 500-foot radius of an infected tree in the south end of the swamp were pruned. This work was performed by men who were being trained in tree climbing for later assignment as scouts for beetle-infested elms.

Elm-foliage development delayed.--Throughout the New York work area elm leaves did not appear on the trees until the first of May. Small leaves had appeared on most of the elms by May 6. Elm leaves were fully two-thirds grown by May 7, 1938.

Spring soil treatments at isolated Japanese beetle infestations.--In May 57.3 acres was treated in cities in Illinois, Indiana, North Carolina, and Ohio. In Chicago, 9.6 acres was treated between May 22 and 31. The Chicago treatment is being continued into June. In Indianapolis, 7 acres was treated from May 25 to 31, also carrying over into June. In Conneaut, Ohio, where soil spraying was started on April 22, treatment of 7 acres was concluded on May 2. At Ashtabula, Ohio, 8.4 acres was sprayed between May 3 and 11. Soil treatment in East Spencer, N. C., started on April 21, was completed on May 5, with a total of 21.4 acres covered. Between April 25 and May 4, 7.2 acres was treated in Durham, N. C. In Raleigh, N. C., treating started on April 29 was finished on May 6 for a total of 8 acres sprayed, and 10 acres was treated at High Point, N. C., between May 1 and 6. All of these treatments were in cooperation with the States or cities infested.

Methyl bromide fumigation begun in Pennsylvania.--On May 1 a nurseryman at Strafford, Pa., completed the first fumigation chamber to be used in the State. Since that date 3,145 potted plants have been fumigated and certified for shipment from the infested area. These plants, valued at $1,500, would not have been certified under previous fumigation requirements. A further demonstration of methyl bromide fumigation was held at a large greenhouse establishment at Norwood, Pa., on May 3. This was well attended by nearby nurserymen and florists, who brought nursery, perennial, and greenhouse stock for fumigation. This stock was returned to the respective owners for observation. A similar demonstration was also staged at Bloomsburg, in central Pennsylvania, on May 23. The Pennsylvania Nurserymen's Association has requested that a demonstration be arranged for their annual summer picnic to be held at State College.

Eighty thousand traps to be used in Maryland Japanese beetle retardation campaign.--Plans for the second season of the large-scale retardation program sponsored by the Maryland authorities call for the use of 80,000 traps instead of the approximately 40,000 used last summer. An adaptation of the standard Japanese beetle trap has been developed by George S. Langford, who believes that the larger trap will prove more efficient in their campaign, much of which is done in cooperation with individual farmers who set and tend the traps in their own fields.

Early Japanese beetle emergence.--The earliest report of Japanese beetle emergence came from Strafford, Pa., where a single adult was collected from a buttercup growing near the south side of a building. Traps set in the Norfolk, Va., area to indicate emergence caught one beetle on May 29.

FOREST INSECT INVESTIGATIONS

Pine beetle damage in Oregon and Washington.--According to F. P. Keen, a report has just been issued by the Portland forest-insect laboratory summarizing the results of bark-beetle surveys conducted in the ponderosa pine forests of Oregon and Washington during the last 5 years. This report shows that beetles have killed an average of 530,000,000 board feet of ponderosa pine saw timber in Oregon and Washington each year during the period 1931 to 1937, inclusive. This is 70 percent as much as the total saw timber cut by all the pine sawmills operating in the region and nearly 28 times as much timber as was killed by forest fires in the pine region during the same period. The total value of this loss is estimated at over $2,000,000 a year, while an average of $92,410 a year has been spent by Federal, State, and private timber agencies in control work.

Mountain pine beetle likes large trees.--The mountain pine beetle not only appears to select the larger western white pine trees for attack but also produces more abundant broods in them, according to W. D. Bedard, of the Coeur d'Alene, Idaho, laboratory. The following tabulation, resulting from 295 trees examined during the last 3 years, shows the average number of attacks and mountain pine beetle brood in trees within various diameter classes.

Diameter (inches)	Average per square foot	
	Attacks	Brood
	Number	Number
6-10----------	5.3	4.3
11-12----------	5.2	17.5
13-18----------	5.2	19.5
19-24----------	6.1	22.8
25 or more----	5.1	26.1

It is obvious that trees under 10 inches in diameter produce insufficient brood to be of importance and need not be considered in control work. It is also apparent that the larger the tree the more abundant are the broods produced and, as the larger trees contain more infested bark surface, they are the most important trees from the standpoint of control.

Budworm outbreak on Douglas fir in Colorado.--A widespread increase in the infestation of the spruce budworm strain attacking Douglas fir is reported by Donald De Leon, Fort Collins, Colo. Last year the infestation occurred only in isolated patches in the stands of Douglas fir in the canyons leading out from Estes Park and other nearby canyons. This year the infestation has spread so that the patches are now united and very severe defoliation is expected. Considerable defoliation of the new growth has already taken place. In the defoliated stands it is probable that parasites and climatic conditions will control the outbreak before a great deal of damage is done.

Paper birch in northern Wisconsin defoliated by weevil.--H. J. MacAloney, Milwaukee, Wis., reports that adults of a small weevil, Orchestes alni var. pubescens Steph., are so numerous in stands of sapling and pole-size birch on the Chequamegon National Forest in northern Wisconsin that hundreds can be jarred from a single tree. The shot-hole feeding was sufficiently heavy on May 29 to make foliage noticeably thin, and it is probable that almost complete defoliation will result in some stands before feeding ceases. This insect has been present in northern Wisconsin for several years, and it appears that successive defoliations have so weakened the trees that they are now subject to attack by the bronze birch borer.

Hemlock borer active early in Wisconsin.--On May 17 H. C. Secrest, Milwaukee, found the hemlock borer in all stages of development, from second-instar larvae to adults. In log decks pupae and adults were found in the bark of that portion of the logs which was exposed to the sun. Emergence from these logs was first noticed on May 22. On May 24, 2 adults which had apparently emerged from standing trees in an exposed part of the forest were also found, and by May 29 the beetles were numerous. By means of a potentiometer, temperatures of the upper and lower surfaces of logs in an exposed deck were obtained, and a correlation between temperature and development of the borers was evident. On May 31 no beetle emergence had taken place from the lower third of the log surface, only 5 had emerged from the sides, and 52 beetles and 22 parasites had emerged from the upper surface of the exposed logs. The difference in temperatures at the bark surface of the upper and lower surfaces of exposed logs showed a variation of 52° F. No emergence had occurred on May 31 from a log deck which had been under shade in a fairly dense stand.

Notes on an introduced pine sawfly.--C. L. Griswold, Morristown, N. J., who is making observations on some of the introduced sawflies that feed on pine, has found that the larvae of Neodiprion sertifer Geoff. sometimes sever, or partially sever, the young pine shoots and feed on the bark of the growth of the preceding 2 years. Instances of such injury were noted during May in certain areas where the larvae were abundant. Because of the presence of this sawfly, over 100 acres of planted pine on estates in northern Somerset County, N. J., were sprayed this spring with an arsenical mixture applied with an autogiro.

Hickory bark beetle found in elm trees.--Adults of the hickory bark beetle (Scolytus quadrispinosus Say) have sometimes been taken from the surface of felled elm trees in New Jersey. In 1937 W. D. Buchanan, of the Morristown, N. J., laboratory, reared adults from elm logs with which beetles had previously been confined. In February 1939 the Dutch elm disease eradication unit submitted a piece of elm containing galleries of this species from Fall Creek Township, Hamilton County, Ind. This is the first record that the laboratory has of *S. quadrispinosus* breeding in elm in the field.

Forest tent caterpillar decreases in parts of New England.--J. V. Schaffner, Jr., New Haven, Conn., reports that observations early in May on the forest tent caterpillar in various localities in Vermont and one locality in western Massachusetts, where feeding has been heavy during the last 3 or 4 years, indicates that the infestation is at present, on an average, some 50 percent less than a year ago. In the city of Barre, Vt., many shade trees were found to be heavily infested, and spraying was advised. In other localities examined, although egg clusters and small larvae were very common, it seems improbable that serious defoliation will result from the feeding by this species in 1939. General hatching occurred throughout this region about the end of the first week in May, probably about 2 weeks later than normal.

Pine plantation in Massachusetts heavily infested with weevils.--A severe infestation of a little-known weevil, *Hylobius radicis* Buchanan, was reported in a plantation of Scotch, Corsican, and white pines on a watershed at Weston, Mass. An investigation by J. V. Schaffner, Jr., disclosed that this plantation was originally planted in 1926 and that replacements have been made from time to time. In the hurricane of September 1938 approximately 50 percent of the trees were uprooted or broken off at the base and most of these were found to be infested by this insect, which works under the bark at the tree base. Counts in three sample plots showed that approximately 82.5 percent of the Scotch and Corsican pine was infested in this 5-acre plantation. A few red pines along the edge of a bordering plantation were also found to be infested.

Hurricane-thrown white pine timber lightly infested.--Mr. Schaffner visited several dry storage sites in Massachusetts and southern New Hampshire and examined white pine logs and round-edged lumber on May 23 and 24. Five species of bark beetles were found beneath the bark of white pine logs and have been tentatively determined as *Dendroctonus valens* Lec., *Hylastes porculus* Lec., *Hylurgops pinifex* Fitch, *Ips pini* Say, and *Pityogenes hopkinsi* Sw. No cerambycid or ambrosia beetles were found. Considerably less than 1 percent of the logs were attacked, and these were only lightly infested.

European spruce sawfly plots established in Northeast.--F. B. Dowden and W. F. Sellers, New Haven, Conn., report that during April and May 9 permanent sample plots were established for a detailed study of *Diprion polytomum*. Plots were laid out in the following townships: Orange, Conn.; Westfield, Mass.; Dublin, N. H.; Pharsalia, N. Y.; Marlboro, Vt.; Woodford, Vt.; Township 30, Maine; Township 12, Range 16, Maine; and Township 11, Range 15, Maine. Each plot consists of 4 acres and contains 100 numbered trees, with the exception of the 1 plot located in Township 11, Range 15, Maine, which is 2 acres in extent. At the side of each numbered tree a stake has been set and a square-foot sample of duff removed and brought to New Haven for the purpose of analyzing the sawfly cocoons present. Results of these analyses will be reported later. Weather-recording instruments have been placed at each plot with the exception of Orange, Conn., Pharsalia, N. Y., and Township 11, Range 15, Maine. Records for Orange, Conn., will be obtained from New Haven; those for Pharsalia, N. Y., from the Forest Service station at Chenango, and it is believed that Township 11, Range 15, Maine, is near enough to Township 12, Range 16, Maine (5 miles) for 1 set of instruments to serve both plots. It is planned to establish 2 more permanent plots during the summer, making a total of 11.

Cost of spraying for white pine weevil.--The cost of spraying white pines with concentrated spray mixtures in 1938 and 1939 averaged approximately $2.75 per acre, which includes the total cost of insecticide, equipment, and labor. S. F. Potts, New Haven, who conducted these experiments, believes that it is possible to materially reduce this figure by improving the apparatus used for applying the concentrates.

Rate of reinfestation by European pine shoot moth in control plots.--Mr. Potts also reports that a partial survey of plots sprayed during the last 2 or 3 years indicates that where nearly complete kill was obtained very little reinfestation has resulted and the trees have recovered rapidly. Where 75-percent kill (or less) was obtained the infestation 2 years after treatment was about equal to that in the untreated check area. Experiments indicate that two applications of concentrated spray, with an interval of 3 or 4 years between applications, should be sufficient to protect all susceptible pines, with the exception of mugho pine, during the entire life of the tree. Few trees under 6 years or over 14 years of age are seriously attacked.

Observations on infestations of Matsucoccus gallicolus in New England.--On May 5 it was noted by T. J. Parr, New Haven, that egg masses of *M. gallicolus* had started to hatch at Plainville, Conn. This was before the new growth was well started and indicates that there may be a decrease in the population of the insect in the Plainville infestation this year, owing to lack of new growth when the first nymphs emerged. Material from Kent, Conn., showed that the eggs did not hatch as soon as at Plainville, and the new growth is now well covered with feeding nymphs. Examination of the Cape Cod, Mass., and southern Rhode Island infestation areas on May 25 and 26 showed the infestations which were heaviest on Cape Cod in 1937 to have been reduced somewhat, indicating that the twigs which were most heavily infested died early enough in the summer to cause the death of the insects present. The insect is, however, more widespread in its distribution on Cape Cod than it was in 1937. The salt-water spray, which drenched infested trees along the shore in southern Rhode Island during the hurricane of last September, did not affect the egg masses under the bark scales, and these eggs have now hatched.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Slow foliage development may retard spraying.--Tree foliage has developed so slowly this year that it appeared doubtful by the middle of May that the woodland growth on high elevations in Vermont, Massachusetts, and Pennsylvania would be sufficiently grown to warrant spraying by June 1. Buds on white oak were just beginning to open in some of the more exposed localities, but in more sheltered areas the leaves were approximately from one-fourth to one-third normal size. By the end of the last week in May most of the foliage was about half grown over most of the area. In certain sheltered pockets and in towns and villages foliage conditions were

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more favorable for spraying, especially in the Pennsylvania section. The cold days and frosty nights also retarded the development of the foliage on the higher elevations in northwestern Connecticut, where much of the spraying in that State will be done.

Dry forest conditions force rigorous ban on smoking and fires.--A serious fire hazard existed during May throughout the region in which gypsy moth work is conducted, as there has been little or no rainfall since the latter part of April. The dry forest conditions made it necessary to prohibit smoking or the building of fires in the woods for any purpose whatever by gypsy moth workers. The one exception to these regulations was an area in Bear Creek Township in Pennsylvania, which is completely surrounded by water and where the burning of slash and forest debris was permitted during this period. The machine developed by this activity for reducing to sawdust brush and other materials that accumulate during selective thinning operations was used advantageously at sites of gypsy moth infestations in Massachusetts where burlap bands will be applied to the trees this season.

Gypsy moth eggs hatch later than usual.--First hatching of gypsy moth eggs was observed in the field on May 8, which is several weeks later than the first hatching noted last year, and is at least 1 week later than normal. Hatching was general in Massachusetts by the middle of May, and the young caterpillars had crawled away from the egg clusters in search of food. Scouting work was necessarily discontinued at this time and some of the workers were detailed to other work.

Cold weather aids nurserymen in World's Fair planting.--The unusually cold spring, which has delayed foliage development to a marked degree, is prolonging the planting season well beyond the time when such activities normally must cease. However, it is reported by gypsy moth supervisory employees that nurserymen on Long Island, N. Y., welcome this condition, as it permits them to complete the final plantings at the World's Fair grounds. This work is done entirely at night, being started after the fair grounds have been closed to the public, and each night's work is completed before opening time the next morning. In this way, conflict with the various activities and exhibits of the fair is avoided. A large percentage of the trees and shrubs transplanted on the World's Fair grounds originates in the section of Nassau County regulated on account of the gypsy moth, and it must be carefully inspected before removal. This is particularly true on the grounds surrounding the Firestone Building, where wild trees and shrubs native to Long Island are planted. There was a marked decrease in the volume of nursery stock offered for inspection in the Long Island quarantined area during the last week in May.

Arrangements for general gypsy moth spraying completed in Pennsylvania and spraying in residential areas begun.--No gypsy moth field work was scheduled for the Pennsylvania area during the second week in May, as it seemed desirable to arrange the schedule in that State so that the entire force would be available for laying hose lines, erecting barbwire fences around areas to be sprayed, and for spraying later in the month. During the following week the men selected as temporary spray-pump operators were assembled at the gypsy moth storage point in Moosic and were given careful instructions relative to the operation and care of the spraying machines to which they were to be assigned. The task of obtaining spraying permits in the residential areas was completed, and all other necessary arrangements were made so that spraying could be started without delay. Up to May 20, approximately 100,000 burlap bands had been applied in the Pennsylvania area, and the required number of workers had been detailed to patrol them at regular intervals to kill the gypsy moth caterpillars. It is not necessary to erect as much fencing around areas to be sprayed as has been the case in the past, as a large part of the territory to be treated this season is situated in heavily wooded mountainous areas where there is little or no grazing. However, this saving in time and labor is offset by the necessity of putting abandoned roads and trails in condition so that spraying equipment can be moved over them to water set-ups reasonably near the areas to be sprayed. City spraying in the Pennsylvania area was started on May 22, with 14 spraying machines operating in pairs. One machine of each pair applied the spray and the other followed with water to wash the spray residue from buildings, walks, fences, and garden furniture. Weather conditions were satisfactory for this type of spraying work, as the spray dried rapidly and there was little movement of air to carry the spray material into gardens and against buildings. If favorable conditions continue, all sprayers in Pennsylvania will be operating by June 1.

Water company continues to cooperate in gypsy moth spraying operations.--Each year since the gypsy moth was discovered in the Pennsylvania area the Spring Brook Water Company has furnished water from their service lines for use in spraying the infested residential areas in that State, without cost to the Federal Government or to the State of Pennsylvania. The only stipulation has been that the hydrants be opened and closed by experienced men selected by the water company.

Gypsy moth caterpillars emerge later than usual.--The first emergence of gypsy moth caterpillars noted by C. C. C. foremen in Massachusetts and Connecticut occurred on May 8, and hatching was quite general on the following day. The larvae emerged this season a week or more later than normal, and much later than last year, when hatching occurred during the latter part of April, and the percentage of emergence was high. One hundred and twenty-eight gypsy moth egg clusters collected in 22 towns showed approximately 80-percent emergence, whereas 115 egg clusters collected in 12 towns last year gave a 76-percent hatch.

C. C. C. gypsy moth work in Connecticut.--The usual gypsy moth scouting, creosoting, and selective thinning work was carried on in Connecticut by C. C. C. enrollees during May. In addition, a considerable amount of time was used in preparing areas in the heavily infested Granby-Simsbury-Canton territory for spraying. This work involved the repairing of roads, preparing sites for sprayer-truck set-ups, and erecting and strengthening barbwire fences around areas to be sprayed. Spraying operations were started at this infestation on May 25, with the men working on a double-shift basis. It was not possible to operate all of the sprayers at the same time during the early stages of the work, because of the lack of sufficient spray hose. Some of the machines required hose lines more than 5,000 feet long, and these lines were made by taking hose from the other sprayers. As the more distant points are sprayed and the hose lines are shortened, the extra hose becomes available for the other sprayers, which can spray as much territory as can be reached with short hose lines and gradually lengthen them.

Three organizations cooperate in gypsy moth spraying in Connecticut.—Spraying work at the extremely heavy gypsy moth infestation in the Granby-Simsbury-Canton area in Connecticut was made possible through the cooperation of 3 organizations. The Federal Bureau of Entomology and Plant Quarantine is supplying 3 sprayer machines, 9,000 feet of high-pressure hose, and 3 supervisory employees. The State of Connecticut Entomologist's Office is furnishing 2 sprayer machines, about 6,000 feet of high-pressure hose, more than one-third of the lead arsenate and fish oil that will be needed, 10 experienced sprayer-truck operators, 16 nozzlemen, 1 mechanic, and a State truck for the distribution of gasoline and oil to the spraying units. Both the Bureau of Entomology and Plant Quarantine and the State of Connecticut Entomologist's Office are supervising the work. The C. C. C. is providing 150 enrollees; 10 gypsy moth foremen, 3 of whom were temporarily transferred from camps where no spraying work is to be done; and the remainder of the lead arsenate and fish oil required. Without the cooperation of these 3 organizations the spraying of this important area could not be done this season.

PLANT DISEASE CONTROL

Rust observations in Mexico.--E. C. Stakman, in charge of rust surveys for the Division, reports that observations made in southern Mexico in April indicate that rust development was sporadic, heavy rust infection being restricted to early sown fields. At that time there was no evidence that infection had spread from these occasional fields in which rust survived the winter and developed abundantly in the spring. As races 38 and 59, on the basis of identifications made so far, appear to be prevalent, as in the past, it is unlikely that spores were blown from southern Mexico into northern Mexico. Obviously, the uredial stage of stem rust persisted throughout the winter in occasional fields in northern Mexico, particularly near Saltillo and in at least one field south of Monterey. Rust was again absent, or almost entirely absent, from the Laguna area near San Pedro and Torreon. On June 3 the rust situation in Texas and Oklahoma was reported as follows: Wheat was harvested in the San Antonio territory of Texas with very little, if any, damage from rust. Farther north in Texas there was more rust and in Bosque County, for example, it was estimated that three-fourths of the wheatfields had an average stem rust severity of 25 percent and the same was true of about one-fourth of the fields in Dallas, Denton, and Collin Counties. No appreciable damage from stem rust was expected in Texas this year. By May 26, a trace of stem rust was present as far north as northern Oklahoma, where wheat was mostly in the hard-dough stage, or ripe.

Aecial infection on barberries.--By June 3, aecial infection on barberries had been reported from 10 States. On May 24, rust was observed to spread from infested barberries to bluegrass in Pike County, Ill., where aecial infection was more abundant than usual this spring. Barberry bushes were reported rusting heavily in Michigan and about the normal amount of aecial infection had been found in Minnesota. Physiologic race identifications are now under way. Six identifications have been made of the material collected in southern Mexico. These include races 38 and 59. Races 17, 38, 56, 19, and 139 have been identified from collections made in northern Mexico. To date 100 aecial collections have been received and inoculations have already been made from 48 of them.

Resurvey work in northern Wisconsin.--The original survey of the counties in northern Wisconsin was completed in 1924. Comparatively few rural locations were found and very little work has been done in that part of the State since that time. A small crew of men began work in Eau Claire County in April and all old rural locations have been checked. The men are now working in the city of Eau Claire and about two-thirds of the city has been inspected. The results of the work thus far completed show that barberries were found on only 2 of the 7 old rural locations and only 4 new properties were found having bushes. A total of 41 bushes was destroyed on these 6 properties. Of the 71 old locations checked in the city of Eau Claire, only 3 had bushes, but 28 new properties were found with bushes. To date, 131 barberry bushes have been destroyed on these 31 properties.

Several newly infected counties reported in May.--Infection on white pine was found in Tucker County, W. Va., at Horseshoe Public Camp on the Monongahela National Forest. A specimen showed a canker about 1 foot long with aecia, pycnia, and orange-yellow discoloration. This is the first time infection has been found on white pine in this county, although Ribes infection was discovered in 1931 by Messrs. Hodgkins and Geiser. R. G. Pierce reports finding infection for the first time in Hardy County, W. Va., on a small white pine in pycnial stage on Trout Run. Ribes infection in Hardy County was reported for the first time in 1938. Winona County, Minn., has been added to the list of counties where infection on white pine has been found. An infection area of 30 acres in extent, of which 35 percent of the trees possess fruiting cankers, was found near the Winona-Fillmore County line. These counties are close to the northeastern corner of Iowa and may be responsible for the rust in that part of Iowa reported in other years. Infection in Carroll County, Ohio, has been reported for the first time, the disease being found in a 3-acre white pine planting. One tree located about 15 feet from the edge of the woods has 10 fruiting cankers. The infection apparently has spread from a clump of Ribes at the edge of the woods.

Ribes alpinum in vicinity of Madison, Wis., mostly staminate plants.--Staminate plants of R. alpinum have been found by pathologists to be immune to blister rust infection and the pistillate plants susceptible to this disease. This plant is used to some extent as an ornamental shrub in the Lake States region and recently State leader T. F. Kouba examined 400 R. alpinum plants in the vicinity of Madison to determine whether they were male or female plants. All except 5 were male plants and immune to blister rust. Staminate plants blossom much more profusely than the pistillate plants and for this reason apparently have been much more generally used for propagation by cuttings and for ornamental planting than have the pistillate plants.

Control operations started in Northwestern region.--On May 1, the field season in the Northwestern region was started, as operations supervisors moved equipment, supplies, and a few men into camp locations. Within 2 weeks most of the Bureau camps had been established and about 400 men were at work. Forest Service C. C. C. and W. P. A. camps were also started at this time. Because of an unusual period of warm, dry weather in April and the first half of May, conditions are exceptionally favorable for Ribes eradication. Early in June the Bureau's labor personnel in Idaho and Washington exceeded 1,100 men in 16 camps.

Incipient cankers indicate heavy 1937 pine infection in Idaho.--The appearance in May of a relatively large number of incipient cankers on the first unprotected, heavily infected areas surveyed this year indicates that 1937 was favorable for infection of white pine, reports R. L. MacLeod, in charge of disease surveys in the Northwest. These range from pea-sized spots to discolorations ½ inch long, appearing on growths of the years 1937 through 1933. The year 1937 was marked by more than twice normal rainfall in both April and June but extremely light precipitation from July through October.

Dormant-season eradication of Ribes in Maryland.--A study was made in Maryland to determine the comparative efficiency of initial *Ribes* eradication during the spring, summer, and dormant season on skunk currants (*R. prostratum*) and the gooseberries *R. rotundifolium* and *R. cynosbati*. Some of these plots were initially worked during the dormant season, others during the summer, and the third group during the spring when the leaves first appeared on the *Ribes*. All of the plots were reworked during the first spring following the initial eradication. It was found that, in the case of eradication during the dormant season, approximately 83 percent of the total *Ribes* destroyed were found during the winter coverage, and the other 17 percent were dug out during the "mop-up" operations the following spring. In the case of spring and summer work, over 95 percent of the total *Ribes* destroyed could be located the first time over the ground, leaving only 5 percent for removal the following spring. More than 90 percent of the live stem was destroyed during the dormant season's work, and over 97 percent of the live stem was destroyed during the spring and summer operations. The *Ribes* were heavily concentrated on all the plots and in no case was the live stem reduced to a reasonably safe figure by dormant-season eradication. Despite the fact that a large percentage of *Ribes* and live stem was destroyed on initial work, it was found that on gooseberries and skunk currants over 100 and 270 feet of live stem, respectively, was left after the dormant-season working. The study showed that in heavy *Ribes* concentration when the ground is not frozen it may be practicable to do dormant-season eradication, but that a finished job cannot be expected under these conditions.

Observations of blister rust damage in eastern British Columbia.--During the second week in May, E. L. Joy, of the Northwestern regional office, accompanied Forest Service officials of Region 1 on a trip to several of the oldest infection centers in the area from Nelson to Revelstoke, British Columbia. The visit was made possible through the courtesy of Canadian forestry officials. These areas were of particular interest to the party since they had been the object of inspection by three of the group in 1932. In the intervening 7 years the rust had spread into all white pine areas along the route of travel, a condition that possibly exists throughout all of the white pine stands in the eastern part of the Province. Around the oldest centers damage and kill are very severe, running as high as 95 percent of the stand. In fact, the members of the party concluded that the complete elimination of white pine from such areas is certain. It is of considerable interest though that this is not readily noted unless inspection is made within the stand, for many dead and dying trees are already screened from view by other growth, such as willow, birch, and the coniferous associates of white pine. In the pole- and mature-size trees, broken tops and "flags" are the most noticeable form of damage. At several locations it was noted that there is a relative scarcity of pine infection originating in the last few years. Since most of the infection in this region originated on *Ribes nigrum* and wild *Ribes* are very scarce, it seems possible that rust damage to the black currant bushes may have caused their removal from some of the farms. Although no survey of this was made, several known patches of black currants were noticeably missing this year.

Phenological data in the Northeast.--Reports from Maine indicate that *Ribes* were well leafed out by May 20, although other vegetation was very backward, making ideal eradication conditions. The aecial stage of the rust was developing rapidly by May 13 and spores were flying in the southern towns. In New Hampshire, notwithstanding the continued cold weather, *Ribes* continued to develop and by May 20 were coming along well enough for identification by the crews, except at points where snow or ice still persisted. Most of the gooseberry species seemed more backward than other members of the *Ribes* family. In New York foliage had developed to such an extent by May 13 that work was in full progress in the southern part of the State. In Massachusetts, State leader Perry reports that while visiting at Wareham in Plymouth County in the early part of May, he found *Ribes*, chiefly escaped red currants, in half leaf. Aecia were just opening in infection areas visited. Mr. Perry says that the woodlands in Wareham escaped the hurricane with very little blow-down damage, but practically all the mature timber suffered appreciably from salt spray. Many of the stands are completely defoliated or are becoming so. The buds, however, are apparently unharmed and are now developing so that it will be a question of whether or not the new foliage will be able to carry the trees through this present season. Field conditions from May 6 to 12 were ideal for *Ribes*-eradication work, as extreme temperatures during the early part of the month served to stimulate foliation of the *Ribes* but other associated vegetation, especially ferns, had not advanced sufficiently to obscure the *Ribes*.

Spring opened early in the Northwest.--Owing to a warm, dry period in this region during April, snow melted from the lower and middle elevations early. As a result, *Ribes* started to leaf out in April, and this continued rapidly in May, because of the continued warm weather. Coincident with the appearance of the leaves was the beginning of heavy production of aecia. General infection of *Ribes* is taking place as a result of a period of occasional rains that started about the middle of May.

COTTON INSECT INVESTIGATIONS

Characters of cotton plant in relation to boll weevil injury.--In an effort to determine whether some types of cotton were more resistant to the attacks of the boll weevil than others, E. W. Dunnam and J. C. Clark, Stoneville, Miss., studied 12 commercial varieties of cotton over a period of 3 years. Two pure-line varieties (self fertilized for several years) were studied during 1 season for comparison with the commercial types. Two series of bolls, ranging from 12 to 32 days of age in intervals of 4 days, were tested for boll-wall toughness with a "resistometer" that measured in grams per square millimeter the pressure required to puncture the carpel linings. The tests on the first or "early" series of bolls was started when 12-day-old bolls became abundant on the plants, and the second or late series immediately upon completion of the early series, thus covering the fruiting period when the major portion of the crop was produced. Tests were made both from the outside and inside of the carpels but the results were more reliable when made from the inside or lining side of the carpels. The average resistance to inside puncture over the 3-year period for the early series of bolls was 885 grams per square millimeter and for the late series 950 grams per square millimeter. Statistical analysis showed highly significant differences between certain varieties. The greatest increase in toughness or resistance occurred in all varieties in bolls between the age of 12 and 20 days. In all but 2 varieties the resistance in the early series of bolls progressively increased with age up to 32 days, whereas in the late series the resistance decreased after 24 days of age. The thickness of the boll walls and the diameter of the bolls were measured with calipers at the time the resistance tests were made. The average boll-wall thickness was 2.31 mm. for the early series and 1.88 mm. for the late series of bolls. Bolls of some varieties had significantly thinner walls and offered more resistance to puncture than other varieties with thicker walls. There was a strong negative correlation between the mean boll-wall thickness and mean resistance of carpel lining to punctures. This negative correlation was also observed within individual varieties when seasonal influences caused the boll-wall thickness to increase. Pairs of boll weevils enclosed in muslin bags with bolls caused the greatest damage to lint of varieties with thin boll walls, the next greatest to those with thick walls, and least damage to those with walls intermediate in thickness. Examinations of bolls showed that practically all feeding and egg punctures penetrated the carpel linings and reached the lint of the thin-walled varieties, but many punctures did not penetrate the carpel linings of the thick-walled varieties. In some of the latter bolls the eggs hatched within the boll walls but the larvae were not able to penetrate the lining and after feeding outside the lining for a while perished for lack of suitable food. Nevertheless, such feeding damaged the locks within. A positive correlation existed between the percentage of damaged cotton and resistance to puncture. Therefore, toughness of the lining without the protection of boll-wall thickness is of little value in resisting damage caused by weevil punctures. There appeared significant differences among the varieties with respect to the average number of boll weevil punctures per lock. Statistical analyses showed that there were significant differences among all varieties tested with respect to age of bolls, and among some with respect to early and late series. Over the 3-year period the significance of the variance contributed by the interaction of ages times series ranged from nothing to a very high factor. No significant differences could be established between Arkansas 17 selfed line and the commercial type with respect to resistance to puncture or boll-wall thickness. Neither could significant differences be established between the Half-and-half selfed line and the commercial type with respect to resistance, but there were with respect to boll-wall thickness. There were differences in brilliance loss caused by the boll weevil among the varieties studied, but no statistical differences in the gain of undesirable colors. The loss in staple length of weevil-damaged cotton differed slightly among the varieties, but no significant differences could be established. The average bloom intervals on fruiting branches ranged from 5 to 6 days among the varieties, while the average time required from beginning of square to open bloom ranged from 22 to 25 days. There was a great variation among the varieties in total bloom production, with a difference of 20.6 percent of blooms produced by August 8. All cottons had a complete rest period before second growth began and the more determinate ones produced 30 percent less second growth blooms during the peak week of October 4 to 10. The percentage of total blooms that produced bolls ranged from 27.3 to 47.4. The percentage of first-growth leaf drop among the varieties ranged from 24.4 to 52.1. The percentage of plants with no lateral branches was 19. The percentage of plants having lateral branches 1 to 6 inches long was 19, and the percentage having lateral branches 7 to 12 inches long was 35. The average terminal bud second growth ranged among the varieties from 2.7 to 7.0 inches.

Effect of cryolite on plant growth.--A preliminary test to determine the effect of synthetic cryolite on the germination and growth of cowpeas was conducted by F. F. Bondy and C. F. Rainwater, of Florence, S. C., this spring. Cryolite was added to a fairly fertile sandy soil, typical of the section, at the rates of 100, 200, 400, 800, and 1,600 pounds per acre. Six-inch pots were filled with the soil and planted to cowpeas under greenhouse conditions. The germination was not affected and the peas in all the treatments grew at approximately the same rate. Cowpeas are very susceptible to injury from arsenic in the soil, but apparently synthetic cryolite is safe to use as an insecticide insofar as soil injury is concerned.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Inspection.--Bloom inspection, which was begun in April in the Brownsville-Matamoros area of the lower Rio Grande Valley of Texas and Mexico, was continued throughout May. Inspections in this area are begun each season when the first cotton blooms appear and are continued throughout the development of the cotton crop, with intensive inspection of trash from cotton during the ginning season. These inspections are made for the purpose of determining the degree of pink bollworm infestation in this area, and thus give a knowledge of results being obtained from the control and eradication program which has been in effect on both sides of the Rio Grande since the discovery of the pink bollworm 3 years ago in this subtropical area lying adjacent to the main Cotton Belt of Texas. The first pink bollworm from the 1939 cotton crop was found in the Brownsville area on May 1. Systematic bloom inspection was begun on May 9 where infestation has been heaviest since its inception, and to the end of May 512,016 blooms had been inspected in the Brownsville area of Cameron County and 797 pink bollworms found. Of this total, 487 specimens came from the A. Leal field and 277 from the Lozano Banco field, the two most heavily infested farms on the American side, and 33 specimens came from 9 miscellaneous fields. A total of 167,072 additional blooms were inspected in Starr, Hidalgo, and Willacy Counties of the lower Rio Grande Valley area with negative results. In the Matamoros area of Mexico, 174,369 cotton blooms were inspected in cooperation with Mexican inspectors during May, and 16 specimens of the pink bollworm were found. As a result of bloom inspection in the Brownsville area, consideration is being given by the State to the purchase of the cotton crop on the two heavily infested fields, after which all fruit capable of sustaining the pink bollworm will be picked off daily to prevent dissemination of the pink bollworm. In the meantime all rosette blooms in the 2 heavily infested fields are being picked daily in an effort to check infestation while condemnation proceedings are being carried on for the purchase of the 2 fields. Arrangements have been made for a State Compensation Claim Board to be appointed early in June to carry out condemnation proceedings.

Conditions in the Big Bend.--Owing to the late planting date of April 20 being observed on both sides of the Rio Grande in the Big Bend area of Texas and Mexico, and a further delay in many cases because of extremely cold weather during the latter part of April, cotton in that area as a whole is very late, and cool nights up until recently have retarded the growth of plants. A few small squares could be found in the earliest plantings in the Presidio area on May 25, and it is not believed that any squares will be large enough to afford food for the maintenance and propagation of the pink bollworm until the first week in June, and cotton is not expected to begin blooming until around June 25. Therefore, owing to the fact that all dangerous stub cotton has been eliminated from the Presidio and Ojinaga areas on both sides of the Rio Grande, it is believed that pink bollworm moths have been emerging in those areas since about the middle of March and have perished on account of finding no food on which to live and reproduce themselves. This conclusion is based on past experience in the control of the pink bollworm in this area and is substantiated by observations made by the Research Division of the Bureau at Presidio, Tex. Indications are, therefore, that our efforts to reduce the heavy pink bollworm infestation in the Big Bend area are bringing about good results and that we can expect a substantial gain in the program toward control in the 1939 cotton crop.

Pink bollworm eradication in Arizona.--The spring program which was begun in the east end of the Salt River Valley on April 10, and the program for the destruction of stub cotton which might be the means of carrying over the present light infestation of the pink bollworm in Maricopa, Pinal, Pima, and Santa Cruz Counties, were brought to a satisfactory conclusion at the end of May. This control work was begun in the winter of 1938-39, following discovery of reinfestation in the Salt River Valley where it was eradicated during the years 1929-31. This program consisted of the cutting of all 1937-38 cotton stalks, followed by the raking and burning of all plants and debris, a delayed planting date for all cotton, and the elimination of stub or soca cotton from the acreage involved, thus providing a starvation period for emerging pink bollworm moths prior to the fruiting of the 1939 cotton crop. An educational campaign was also begun among farmers early in the year with reference to the destruction of stub cotton, pointing out to growers the very important phase of this work and enlisting their cooperation, and it is felt that outstanding results were accomplished. Much of the credit for the successful accomplishment of the stalk-destruction phase of the program must be given to the Agricultural Adjustment Administration through their timely cooperation in issuing a regulation requiring the destruction of all stub cotton in the affected areas. This regulation was issued by the A. A. A. following its determination that failure to destroy volunteer or stub cotton would constitute a practice which would defeat the purposes of the 1939 Agricultural Conservation program, and that it would also greatly assist the Bureau and State of Arizona in carrying out the control program. Exceptionally fine cooperation was also given voluntarily by many farmers who did not come directly under the jurisdiction of the A. A. A.

Wild-cotton eradication in southern Florida.--Wild-cotton eradication in southern Florida made good progress during May. For a number of years an effort has been under way to eliminate wild cotton from this section of Florida owing to the fact that it is infested with the pink bollworm, and is thus an ever-present danger of dissemination of the pink bollworm to domestic cotton plantings. Toward the end of the month all areas had been cleaned twice and a third cleaning started. Approximately one-third fewer acres were recleaned over the entire area in May than during April, and approximately 4 times as many plants were destroyed. The increase in the number of plants was due to heavy rains in April. Particular attention was given to recleaning wild cotton colonies in the Bradenton subdistrict and less time given to scouting doubtful areas. Only 15 plants with mature bolls were found and 12 of these were cultivated plants. The third cleaning of the season was completed in Pinellas and Hillsborough Counties. A second cleaning was completed in Manatee County and a third cleaning started. In the Fort Myers subdistrict all areas were cleaned twice and a third cleaning started toward the end of the month. More than twice as many acres were cleaned in this subdistrict in May as in the previous month and approximately 4 times as many plants destroyed. As stated above, the increase in plants was due to heavy rains during the previous month. Only 8 plants with mature bolls were found in the entire subdistrict. The second cleaning of the season was completed in the Ten Thousand Islands section. This concludes the work in that section for this season. During the month 203 plants with mature bolls were found in that area. At one time it was thought that the Ten Thousand Islands section would be one of the most difficult from which to entirely eradicate wild cotton plants but, judging from this season's results, excellent progress is being made toward the eradication of wild cotton in that area. In addition to recleaning known wild cotton colonies, 3 small colonies comprising only three-fourths of an acre, located as a result of the aerial survey, were cleaned for the first time, 114 virgin plants being found and removed. These colonies were on 3 small outlying islands. Twenty such islands in that same vicinity were examined, with wild cotton being found on 3 of them. The second recleaning of the season was in progress over the entire keys subdistrict. There was no appreciable increase in the number of wild cotton plants found per acre, as there has been little rainfall on the keys, except in the Key West area. In the entire Florida district 316 wild cotton plants with mature bolls were found. Of this number 253 plants were found on Key Largo. A few specimens of the pink bollworm were also found on Key Largo.

Thurberia-plant eradication.--Good progress was made during May in the destruction of Thurberia plants in the Santa Cruz Valley of Arizona. This program has been in progress for several years in the various mountain ranges of southern Arizona, through the provision of W. P. A. funds, for the purpose of depriving the Thurberia weevil of a host plant and thus prevent its spread to cultivated cotton plantings. Approximately 19,040 acres was covered during May and 14,517 Thurberia plants destroyed, most of which were heavily infested with the Thurberia weevil. The total number of laborers actually employed on the cotton line during the period was 136, making a total of 2,713 man-days worked. If the requisition already in the hands of the State Administrator for laborers is filled in June, it is anticipated that it will be possible to clean out most of the plants in the larger canyons on the west side of the Tucson-Nogales road and then put crews of men in the larger canyons on the east side, thereby removing the greater number of large plant colonies before the summer rains, which will release weevils from their cells.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Sulfonation of certain vegetable oils increases toxicity to harlequin bug.--Preliminary laboratory tests conducted recently by R. A. Fulton and N. F. Howard, of the Columbus, Ohio, laboratory, have indicated that certain sulfonated vegetable oils were more toxic to the harlequin bug than the natural oils in tests designed to determine their efficiency in combination with rotenone-bearing materials. The oils which were not very toxic to *Murgantia histrionica* Hahn. before sulfonation and which were more toxic when sulfonated were soybean, coconut, castor, linseed, and corn oil. Toxicity of the following oils, which in general were more toxic in the natural state than those mentioned before and which were not appreciably increased by sulfonation were olive, teaseed, and cottonseed oil. Sulfonation of soybean oil increased the toxicity to *M. histrionica* from 39 to 87 percent. It was noted during the preparation of the spray solution that sulfonated soybean oil in combination with cube required much less stirring to attain a uniform suspension. It was noted also that the cube particles remained in suspension much longer in sulfonated soybean oil than in the emulsions prepared from the other natural and sulfonated vegetable oils included in these tests. Sulfonation did not reduce toxicity of any of the vegetable oils included in the tests. It appears, therefore, that sulfonated oils could be substituted for the natural oils with considerable facility from the standpoint of mixing sprays in the field.

Control of aphids on lettuce by hydrocyanic-acid gas fumigation.--C. A. Weigel and G. V. Johnson, of the Beltsville, Md., laboratory, in conducting a series of six fumigations with calcium cyanide for the control of aphids on greenhouse-grown lettuce, report that dosages varying from 1/8 to 1/4 ounce per 1,000 cubic feet of space, with exposures made at weekly intervals, were tolerated by the lettuce under conditions simulating commercial practice. A slight bleaching occurred on the edges of the leaves of some of the plants but this condition was shown not to be caused by the fumigation but was apparently intensified by it. Mortality records of aphids on infested plants growing in pots placed in the greenhouse during varying exposures indicated that a dosage rate of 3/16 ounce was necessary to give a satisfactory kill of the potato aphid and a 1/4-ounce dosage was needed to control the green peach aphid. These results agree with those obtained during the course of tests performed in 1937 and demonstrate that this method of control may have a practical application in large-scale commercial fumigations.

Duration of exposure and low temperatures affect mortality of overwintering beet leafhoppers.--Studies performed by F. H. Harries, of the Twin Falls, Idaho, laboratory, on the lethal effect of low temperatures on overwintered beet leafhoppers, demonstrated that the percentage of mortality of the test insects was determined by the duration of the period of exposure, as well as by the existing temperatures. It was found that the duration of the period of exposure necessary to incur complete mortality of the beet leafhopper ranged from approximately 20 days at 30° F., which is near the lowest limit for feeding or physical activity, to less than 12 hours at 0°. These experiments disclosed that the effect of constant low temperatures is more detrimental to the leafhopper than is that of fluctuating temperatures, since an increase of temperature which allowed the resumption of activity each day increased greatly the ability of the insect to resist exposure to cold. In contrast to the effect of constant temperatures or continuous exposures the resistance to cold or the duration of the period of survival was increased by daily fluctuations to higher temperatures for a short period.

Lead arsenate residues on flue-cured tobacco in storage prevent development of tobacco moth larvae.--W. D. Reed and J. P. Vinzant, of the Richmond, Va., laboratory, report that no larvae of the tobacco moth survived on cured leaves of flue-cured tobacco which were sprayed just before harvest time in the field with a spray containing 4 pounds of lead arsenate to 50 gallons of water, applied at the rate of approximately 50 gallons per acre. An analysis of samples of the tobacco leaves involved in the experiment showed them to contain 3.14 grains of As_2O_3 per pound, or 448 p. p. m. The results of these experiments appear to emphasize the fact that arsenical residues on cured tobacco leaves may constitute an important factor in reducing the population of insects affecting flue-cured tobacco in storage, although the presence of such residues is considered detrimental from the viewpoint of the possible health hazard involved and very often on account of the objectionable discoloration. Usually a larger population of insects is found in warehouses of imported cigarette tobaccos (Turkish types) than in the domestic flue-cured tobaccos, although the latter are not high in sugar content and are kept in storage in this country for a longer period of time. Previous experimentation has demonstrated that the larvae of the tobacco moth and of the cigarette beetle prefer to feed on types of tobacco which contain a relatively high sugar content. In warehouses containing flue-cured tobacco it has been observed that a wide variation exists in the degree of infestation in parts of the same hogshead, as well as between different hogsheads, and between different sections of the warehouse. It appears that some of this variation may be caused by such factors as tobacco types, moisture content, and proximity to other infested tobacco but, owing to the determination that residues of lead arsenate prohibit the survival of tobacco moth larvae on cured leaves of tobacco, it seems probable that serious consideration must be given to the effects of insecticidal residues on the populations of insects infesting stored tobacco. It is reported that arsenicals are not used on the tobacco crop in Greece and Turkey, where practically all of the cigarette tobaccos imported into this country are grown, and this point may be significant in explaining the high infestations of tobacco moth and cigarette beetle, which often occur in these imported tobaccos.

Lead arsenate controls vegetable weevil larvae in tobacco plant beds.--F. S. Chamberlin and L. L. May, of the Quincy, Fla., laboratory, report that the vegetable weevil was controlled when infesting tobacco in plant beds by the application of lead arsenate sprays or dust mixtures. The infestations by this pest in most of the plant beds in the Quincy district have been rather light during the spring of 1938, but in several instances the damage caused by the larvae of the vegetable weevil was sufficiently severe to necessitate control measures. Experiments in some of the larger commercial tobacco plant beds, where a fungicidal spray was being used to control blue mold, demonstrated that lead arsenate added to this spray at the rate of 3 pounds to 100 gallons of the mixture exerted excellent control of the weevil in most instances, with no detectable evidence of burning of the tender tobacco seedlings. Light applications of a lead arsenate dust mixture to infested plants were also found to result in satisfactory control of the insect.

Leafhoppers predominate in seed beet fields of Salt River Valley during winter.--Studies conducted by O. A. Hills and Van E. Romney, of the Phoenix, Ariz., laboratory, of insect populations in the fields of beets grown for seed in the Salt River Valley during the months of January, February, and March, have shown that leafhoppers (*Empoasca* spp.) and the beet leafhopper are the predominant species of insects present in the beet fields in this valley throughout the winter period. Plant bugs (*Lygus* spp.) which are abundant in beet fields in this section during spring, summer, and fall, were not found therein during the winter. Several pentatomids and the mirid bug *Creontiades femoralis* Van D. occurred in the beet fields throughout the winter but in very small numbers. These last two groups occurred only in sections where cotton is grown and it is quite probable that they were forced from cotton onto sugar beets coincident with the drying of the cotton plants after frost in the fall.

INSECTS AFFECTING MAN AND ANIMALS

Investigations on sand flies concentrated in Florida.--The work on sand fly investigations, which has been carried on at the Savannah, Ga., laboratory of this Division since about 1931, has been transferred to St. Lucie, Fla., and the laboratory at Savannah has been discontinued. It has been combined with a sublaboratory at Fort Pierce, Fla., which was established in 1936 for the purpose of intensifying the study of the sand fly problem along the east coast of Florida, where these insects are a serious economic pest, and to carry on cooperative work with the St. Lucie Sanitary (Antimosquito) District to determine the efficacy of a certain type of control method that appears promising for the abatement of the flies, particularly along the Indian River. J. B. Hull will continue in charge of the investigations, the field laboratory of which will be located at St. Lucie, Fla. S. E. Shields will assist Mr. Hull in the work.

Salt-marsh mosquitoes to be given especial study.--Because of the greatly increasing importance during recent years of the species of salt-marsh mosquitoes as pests at resorting centers, as carriers of equine encephalomyelitis, and due to the effect which present control methods have on certain wildlife habitats, a sublaboratory of the Orlando, Fla., laboratory of this Division has been established at New Smyrna, Fla., for the purpose of undertaking intensive investigations of these pests. The work will include chiefly detailed studies on the biologies of the species and their ecological requirements, the relation of other salt-marsh fauna and flora to the mosquitoes, and the effect mosquito-control operations have on these. Studies will also be undertaken to develop more satisfactory control methods. The sublaboratory will be in charge of G. H. Bradley, formerly of the Orlando, Fla., laboratory, and he will be assisted in the investigations by B. V. Travis and Jack Russell. R. C. Bushland, formerly assigned to the Menard, Tex., laboratory, has been transferred to the Orlando laboratory to replace T. E. McNeel, who has been transferred to the Division of Domestic Plant Quarantine's field station at Foley, Ala.

Mosquito abundance in Columbia River Valley not likely to be as great this year as last.--H. H. Stage, of the Portland, Oreg., laboratory, reports that the flood crest of the Columbia River was reached on May 22 at 13.9 feet. As it is unlikely that there will be an additional rise, the last hatching of *Aedes vexans* Mg. and *A. lateralis* (Mg.) is probably over. In

1938 the flood crest was reached at 20.8 feet. The mosquito pest, therefore, should be considerably less than last year in the lower Columbia River Valley. Mosquito-control agencies have also done good control work in Multnomah County, Oreg. Several local but heavy breeding areas of Culex pipiens L. have been located within Portland. This is somewhat in advance of most seasons.

FOREIGN PLANT QUARANTINES

Mango found in spare tire.--On May 12 a car bearing a California license arrived on the bridge at Laredo very heavily loaded with Mexican curios and other merchandise. Some of the merchandise included bottles of liquor cleverly concealed in various parts of the car and the owner was emphatic that he had nothing more to declare. The inspectors noting his haste to be off took this as their cue to give the car a thorough search, with the result that one mango was found concealed in a hub-cap on the spare tire of the car. A fine of $1 was assessed and collected by the Customs, as well as a substantial fine for smuggling liquor.

Heavily infested sweetpotatoes used as monkey food.--The British M/S Mattawin arrived at Philadelphia April 24, 1939, from British West Africa with monkeys, birds, and snakes as part of her Philadelphia cargo. While this Bureau is not directly interested in this type of cargo, the necessary food which must be carried to feed these animals is often of great interest to plant-quarantine inspectors. A good example of this was found in 100 pounds of sweetpotatoes, approximately 98 percent of which were infested with living Cylas sp. near compressus (Hart.) larvae, pupae, and adults, some potoatoes containing as many as 10 larvae. Diplodia tubericola was also taken. Other unused feed included 123 oranges, on which Phomopsis citri was intercepted, 5 pounds of mixed brown and paddy rice, 5 pounds of shelled corn, and 1 pound of kafircorn. The cages were required to be cleaned before they were landed and were reexamined at their destination, after the animals had been removed, to make certain that nothing had been overlooked. The deck and quarters where the animals had been kept were swept and washed down and all sweepings along with the various grains placed in boxes to be dumped at sea. The sweetpotatoes and oranges were destroyed by burning.

Pests on orchids from the Philippines.--The potential pest hazards of a single shipment of plants is emphasized by the following interceptions made on a small shipment of orchid plants at San Francisco consigned to an importer in Alameda County, Calif., from the Philippines: A weevil (Orchidophilus sp.), two species of scale insects (Pinnaspis townsendi and Parlatoria pseudoaspidiotus), a mealybug (Pseudococcus lilacinus), and two species of ants (Camponotus sp. and Crematogaster sp.). None of these economic species are known to occur in California.

Cottonseed in packing material.--On April 20 a box containing a glass lampshade packed in about 3 pounds of Egyptian raw cotton arrived at Buffalo, N. Y., in the mails. Examination of the packing revealed the presence of 40 or more fully developed cottonseeds. While no pink bollworm larvae were found, 5 seeds did reveal damage typical of this insect. The cotton packing was removed and destroyed.

Orchid-disease interceptions.--Among the orchid diseases determined recently are Colletotrichum orchidearum All. on Laelia purpurata in baggage from British Honduras on December 14, 1938; *Miltonia* *varieties* in baggage from Australia on March 23; *Paphiopedilum* *longifolium* in mail from Canal Zone on February 23; *Stanhopea* sp. and *S.* *bucephalus* from Mexico on February 21 (mail), March 10 (express), and March 21 (mail); *Cytospora* sp. (no species reported on orchids) on *Epidendrum* sp. in mail from Mexico on January 3; *Gloeosporium* *bidgoodii* Cke. on *Oncidium* *kerstingii* *album* in mail from England on June 17, 1938, at Honolulu and *Oncidium* sp. in baggage from Haiti on January 10 at New York; *Gloeosporium* *cattleyae* Sacc. & D. Sacc. on *Cattleya* *dowiana* and *C.* *skinneri* in baggage from Costa Rica; *G.* *coelogynes* Syd. on *Coelogyne* *cristata* and *G.* *cymbidii* Verpl. on *Cymbidium* *tracyanum* in mail from India on December 20, 1938; *G.* *stanhopeae* All. on *Stanhopea* *bucephalus* in mail from Mexico on March 21, and *S.* *tigrina* in baggage from Costa Rica on February 20; *Gloeosporium* sp., with spores too small for *G.* *laeliae* Henn. on *Laelia* *purpurata* in baggage from British Honduras on December 14, 1938; *Gloeosporium* sp., with spores smaller than either of species reported on host genus, on *Stanhopea* sp. in mail from Mexico on January 17; *Glomerella* *cincta* (Stoneman) Spaulding & v. Schrenk on *Oncidium* *bicolor* in baggage from Brazil on May 2, at New York; *Macrophoma* *oncidii* P. Henn. on *Vanda* *caerulea* in mail from Siam on December 9, 1938; *Pestalozzia* sp. (unlike any species reported on orchid but previously intercepted on orchids from Guatemala) on *Epidendrum* sp. in mail from Mexico on January 3; *Physalospora* *orchidearum* P. Henn. on *Epidendrum* sp. from Mexico on January 3, *Stanhopea* sp. and *S.* *bucephalus* in mail from Mexico on January 17, February 21, and March 21, and *Vanda* *caerulea* in mail from Siam on December 19, 1938; and *Septonema* sp. (perhaps *S.* *orchidophilum* Speg. but the description does not mention small connecting cells between spores) on *Cattleya* *deckeri* in mail from Canal Zone on January 25. Unless otherwise noted interceptions were made at San Francisco.

Entomological interceptions of interest.--A living larva of the dark fruitfly (*Anastrepha* *serpentina* Wied.) was intercepted at New York on February 22 in a sapodilla fruit in baggage from Colombia. A living pupa of the celery fly (*Philophylla* *heraclei* L.) was intercepted at Philadelphia on July 15, 1938, on a celery stalk in ship's stores from Germany. A living larva of the weevil *Orchidophilus* *aterrimus* Waterh. was taken at Honolulu, T. H., on May 14, 1938, in the stem of an orchid (*Dendrobium* *leopardinum*) in baggage from the Dutch East Indies. Living specimens of the scale insect *Phenacaspis* *eugeniae* *sandwichensis* Fullaway arrived at Seattle, Wash., on December 28, 1938, on a coconut husk in baggage from Honolulu. Living larvae of the olethreutid *Laspeyresia* *splendana* Hbn. was intercepted at San Pedro, Calif., on November 9, 1938, in chestnuts in baggage from Japan. Living specimens of *Machatothrips* *artocarpi* Moulton were taken on June 15, 1938, on a dried *Annona* fruit in the field at Agat, Guam. A living larva of the chrysomelid *Psylliodes* *chrysocephala* L. was found at New Orleans on November 28, 1938, in a turnip in ship's stores from the Netherlands. A living specimen of the coccid *Orthezia* *urticae* (L.) was intercepted at San Francisco on March 3 on *Vitis* sp. in cargo from Italy. Living specimens of the pentatomid *Oplomus* *pulcher* Dall. arrived at Laredo, Tex., on February 18 on the foliage of orchids in cargo from Mexico. A living adult of the chrysomelid *Cassida* *nobilis* L. was taken at Washington, D. C., on December 14, 1938, with packing around fruit trees in express from Poland. Two living larvae of the avocado seed moth (*Stenoma* *catenifer* Wlsm.) were intercepted at Mobile, Ala., on July 21, 1938, in two avocados in ship's quarters from Honduras.

Pathological interceptions of interest.--*Alternaria violae* Gall. & Dorsett was intercepted on February 26 at Brownsville on leaves of violets in baggage from Mexico. *Blennoria buxi* Fr. was intercepted at San Francisco on March 15 on 1 plant of *Buxus sempervirens* in a shipment of 367 from Holland. *Botryosphaeria ribes* (Tode ex. Fr.) Grossenb. & Duggar in the *Dothiorella* stage was intercepted at New York on April 17 on a fruit of *Chrysophyllum cainito* in baggage from Jamaica. This fungus had much the same appearance as *Diplodia natalensis*. *Colletotrichum camelliae* Mass. was intercepted at San Francisco on February 21 on *Camellia sasanqua* in cargo from Japan. *Colletotrichum vincae* Speg. was found on a *Vinca rosea* stem in baggage from Bermuda on May 6 at New York. *Cylindrosporium camelliae* Gz. Frag. was found on a plant of *Camellia japonica* in cargo from Japan on February 21 at San Francisco. *Cytospora* sp., *Didymella* sp., and *Didymosphaeria* sp., no species reported on peony, were found on 1 to several plants in a large shipment from Japan on February 9 at San Francisco. *Mycosphaerella citrullina* in the *Ascochyta* stage was found on shipments of cucumbers from Cuba on February 6 and March 7 at New York. *Pestalozzia coccolobae* E. & E. was found on leaves of *Coccoloba uvifera* cuttings in baggage from Bermuda on April 21 at New York. *P. disseminata* Thumen was found on April 20 at New York on *Eucalyptus globosus* leaves in cargo from Italy. *Phoma tenuis* Pass. was intercepted on special permit material of *Camellia japonica* from Japan on February 21 and 24 at San Francisco. *Phyllosticta epigaeae* Pk. was found on trailing-arbutus in mail from Canada on May 23 at Boston. *Puccinia levis* Magn. was found on leaves of *Manisuris rugosa* from Mexico on March 27 at New York. *P. scirpi* DC was intercepted on *Scirpus validus* straw used as packing for frozen oysters from France on February 9 at New York. *Ravenelia arizonica* E. & E. was intercepted on mesquite leaves in the bottom of a truck from Mexico on April 6 at Brownville. *Rhizoctonia bataticola* (Taub.) Butler was intercepted at San Francisco on February 25 in sweetpotatoes from Peru in baggage.

DOMESTIC PLANT QUARANTINES

Baiting operations in northern Great Plains area.--Grasshopper baiting operations in the areas of the northern Great Plains infested with the lesser migratory grasshopper were begun, jointly with the States, counties, and other cooperators, early in May, and reached large-scale proportions by the middle of the month. The unexpected rapidity of the hatch and the severity of the infestation created demands for bait by several counties far in excess of anticipated needs. On idle and abandoned land in this region, Federal operations were begun about the middle of May and by the last week of the month there were 1,316 men and 360 mechanical bait spreaders at work.

Grasshopper baiting in other regions.--Very encouraging results have been obtained in the baiting operations for the long-winged, migratory range grasshopper in areas of Texas, Oklahoma, and New Mexico, where work has been conducted since the latter part of April. The outlook in Colorado is also good. Much of the bait spreading has been done by volunteer or State-employed crews under Federal supervision. Seventy mechanical spreaders were in operation in this area in May. In Arizona, California, and Nevada, strip-baiting was carried on throughout the month of May and proved very effective in protecting crops from migrating hordes of hoppers which moved into the irrigated and valley crop lands from nearby mountain and range areas.

In the Mississippi Valley, Pacific Northwest, and western Great Plains States, some baiting was carried on in May but the infestations in most of these areas had not developed to a need for widespread baiting.

General situation on grasshopper control.--The peak of control activities for grasshoppers will probably be reached in June, with over 1,500 Federal workers and many thousands of farmers engaged in fighting the menace. About 1,000 Federal bait spreaders and over 500 Federal trucks are in use for control purposes. The cooperation of other Government departments and of States, counties, communities, and individuals, as well as railroads and other commercial agencies, is much better than in any previous grasshopper control campaign. With rare exceptions, grasshopper kills are reported to be exceptionally good throughout the migratorial areas. By the close of May 73 percent of the estimated needs for bait had been ordered shipped and reserve supplies sufficient for 10,000 tons had been stored at shipping points in the field. Over 2,000 tons in excess of the estimated needs had been shipped to California, Kansas, Montana, New Mexico, and Oregon.

Grasshopper infestations severe in northern Great Plains.--The migratorial grasshopper situation in the northwestern Great Plains area, particularly in eastern Montana, western North Dakota, eastern Wyoming, western Nebraska, and much of South Dakota, was extremely serious in the early part of June, representing probably the heaviest infestation in the last several decades. These infestations have resulted, it is believed, primarily from heavy migrations to these areas originating a year ago on abandoned farm lands and other nonresident lands in the Dakotas. The present infestations are also on idle land, as well as strips of river wastes and much cultivated area. Recent strong winds blew large numbers of adult hoppers into four southwestern counties of Nebraska.

Grasshoppers developed early this year.--By the first week in June the development of grasshoppers in most areas throughout the infested region was fully 2 to 3 weeks ahead of that in 1938.

Mormon cricket control activities.--The peak of Mormon cricket control activities was reached in May in Washington, Utah, and Oregon. In the above States and Idaho, Montana, Nebraska, Nevada, South Dakota, and Wyoming over 98,000 acres has been dusted, nearly 67 percent of that area having been worked with power dusters. Metal barriers have been placed on nearly 64 miles; oil-on-water barriers on 54 miles; and there are in operation 55 miles of trench barriers. Severe infestations are reported from Idaho and Montana, equal to last year's infestations. In one Idaho county where control has not been necessary for 20 years and another for 3 years, it has been necessary to take action to protect the crops. Eighteen power dusters have been put into operation in the State. In Montana, while several counties are found more severely infested than last year, three counties where extensive control operations were carried on in 1938 have only a light cricket population. In Yellowstone County good progress is being effected with 17 power dusters controlling the crickets on 65,000 acres of cultivated land and 352,000 acres of range. From Oregon severe infestations were reported by the press at the Warm Springs Indian Reservation. Through the assistance of C. C. C. men and Indian crews those hordes of crickets have been forced out of cultivated crops. The C. C. C. men, as well as 100 volunteer men, are assisting in the control work in the Pine and Eagle Valleys of Baker County, Oreg., representing 35,000 acres of farm land.

Nevada dusts Mormon crickets from airplane.--Very good results have been obtained by Nevada State officials in dusting crickets from an airplane, an 85-percent kill having been effected 96 hours after operations. The plane carried 500 to 700 pounds of dust materials and 100 acres were treated in an hour at a cost of 70 cents an acre. It was necessary to limit the work to periods when the air was very calm.

Baiting for Mormon crickets.--Based on favorable results obtained through tests by research workers, the use of millrun-sawdust-sodium fluosilicate as a bait for poisoning Mormon crickets has been put into effect in the control operations in South Dakota, where the Mormon cricket and grasshopper infestations overlap. Supervisors report that poisoning by this method together with the sodium arsenite dust has effected kills of from 80 to 95 percent of the crickets.

Control of white-fringed beetle.--Large-scale spraying, fallowing, and dusting operations were well under way in May in several of the areas infested with the white-fringed beetle. Three huge power sprayers are in use throughout the areas, spreading herbicide on railroad yards in an attempt to keep the vegetation down. These sprayers are mounted on flat cars accompanied by from 2 to 4 tank cars of 8,000 gallons each of oil-base herbicide and are operated by air pressure spreading the material over an area 30 to 40 feet wide. One outfit covers 3 railroad tracks at one operation. In general the railroad companies provide the locomotives, cars, and train crews. The Bureau provides the sprayers, operators, and herbicide. In addition, 50 new sprayers for mounting on trucks are being used around lumber yards, industrial plants, and waste lands or other places where vegetation may be destroyed without economic loss. Large dusting machines are being used wherever practicable to spread calcium arsenate dust as an insecticide. Under a recent improvement to the machine a coverage of 65 feet is now effected, 12 pounds of dust being applied to the acre.

Inspections for white-fringed beetles.--An average of 15 larvae of white-fringed beetles to the square yard was recently found in the Florala, Ala., area in a survey of 27 properties comprising 15,000 acres. A maximum of 60 to the square yard was found at some points in the Laurel, Miss., area. Frequent inspections of the Mobile, Ala., area brought to light only 3 larvae. Thirteen new infestations were found at Monroeville, Ala., in the known infested area, and some newly infested properties were found in other areas adjoining known infestations. An identification unit has been established at the field headquarters office at Gulfport, Miss.

New county infested with white-fringed beetle.--An infestation of Naupactus leucoloma Boh. has been found at Maxie, a town near Hattiesburg, Forrest County, Miss. This county, while not previously known to be infested, lies between two other infested counties. Damage was first reported by a Mississippi State inspector on May 26.

White-fringed beetles emerging.--Live adult beetles were found on May 11 at New Orleans, La.; on May 17 at Gulfport, Miss., on May 22 at Svoa, Fla., and Florala, Ala.; on May 23 at Laurel, Miss.; and on May 30 at Monroeville, Miss., and Pensacola, Fla.

Objectives in the white-fringed beetle program.--A persistent attempt to eradicate the white-fringed beetle in small isolated areas and to determine the best methods and the cost is believed to be the most important phase of this year's work on the project. Drastic suppression in all areas, thereby reducing the risk of spread to noninfested areas and curtailing costs in quarantine enforcement, will also be worked for. The four primary activities in the two-fold program as worked out with the cooperating States are (1) soil fumigation in certain small areas where eradication is the objective, (2) clean cultivation to free released farm lands from vegetation, (3) the application of weed killers on infested idle and abandoned lands, and (4) the application of insecticides where this type of suppression is practicable.

Peach mosaic court case.--On May 26 the California Supreme Court rendered a decision in favor of the State of California in the case against an organized committee representing a minority of peach growers of the State. The case had been in the courts for the last 3 years. As a result of the decision, approximately 29,000 mosaic-infected trees will be removed in certain areas of San Bernardino and Riverside Counties. In the last 3 years 76 percent of the owners had already consented to the removal of diseased trees and the indications are that in future full cooperation will be received from all members of the opposition group.

Peach-inspection activities.--Peach mosaic inspection in May was confined largely to the environs of peach nurseries and of budwood sources in the 7 Southwestern States in which the disease is known to exist. Under standardized quarantines of the infected States, peach nurseries and peach budwood sources, as well as the 1-mile zones surrounding them, must have been inspected and all diseased trees removed prior to May 15, in order to meet certification requirements. Over 200 nurseries and a similar number of budwood sources were inspected and only 9 failed to meet that requirement. In addition there are 12 nurseries in Mesa County, Colo., so located in the heavily infected area that they could not meet the certification requirements. General orchard inspection for the peach mosaic disease was also conducted during the month in Arizona, California, Colorado, New Mexico, Oklahoma, Texas, and Utah. Phony peach inspection was well under way in May in nurseries in Arkansas, Georgia, Tennessee, and Texas. There are 172 inspectors making inspections for these diseases, 123 being Federal employees, 44 State men, and 5 county inspectors. There were 946 relief employees engaged in removing abandoned and escaped peach trees in 12 infected States by the last of May.

Sweetpotato weevil control.--Inspections of stored sweetpotatoes, of sweetpotato planting stock, plant beds, volunteer sweetpotato plants on infested properties, and of wild host plants were made in May in Alabama, Georgia, Mississippi, and Texas. Storage places were cleaned, plant beds removed, volunteer sweetpotato plants destroyed with the work of W. P. A. laborers, and quarantine regulations enforced. One shipment of 5,000 infested sweetpotato plants shipped into Alabama was destroyed, and several other uncertified shipments were confiscated under State authority. Quarantine signs were erected on the Georgia-Florida State line notifying the public of the penalty and danger in bringing contraband material into Georgia. The Texas work was centered on properties under quarantine in 3 counties and on making a survey for weevils in Panola County. The number of certified growers in that area has more than doubled in the last year. No weevils were found in Panola County. In the 4 States, 284 properties were inspected during the month and 31 infestations were found. Reinspection was made of 1,337 properties in the quarantined areas.

Sweetpotato weevils diminishing in Georgia.--Cooperative eradication measures are in progress in Thomas and Glynn Counties, Ga., the only counties in the State in which weevils are known to exist. Camden and Charlton Counties are believed to have been freed from the pest. Previously infested centers are periodically checked, however, by the State inspectors, and much educational and regulatory work is conducted throughout the southern part of the State. The control activities mentioned in the April News Letter, as carried on in 11 Georgia counties, referred to reinspections, surveys of stored sweetpotatoes, and educational and regulatory work.

Public becoming quarantine conscious.--It is the general observation of transit inspectors at all the Midwest points that the proportionate number of certified parcels, as compared with uncertified parcels of plants, shipped by individuals in the East has so increased that it appears the public is better aware of and is complying more fully with the Japanese beetle and gypsy moth quarantine regulations than in former years. This was also the comment of inspectors in the East with respect to Christmas shipping last year.

Violations intercepted.--There were 504 quarantine violations intercepted by transit inspectors in May, and California State inspectors reported the interception of 11 violations of Federal domestic plant quarantines. With the assignment of additional inspectors at New York City, six tours of inspection were made possible over hours ranging from 1 a.m. till midnight. The work of an Illinois inspector assisting at Chicago and of a Nebraska inspector at Omaha has been of substantial assistance in the spring nursery-stock shipping season.

Citrus canker eradication continues in Texas.--Work during May consisted principally in "strip working" for escaped Citrus trifoliata trees, areas in Texas from which these trees had been eradicated in the past. This work was accomplished with 148 relief laborers. Over 100,000 such trees were removed during the month. Inspection activities were also carried on by 9 Federal inspectors in 4 counties of the Galveston region. There were 632 properties inspected. No canker has been found in Texas since September 19, 1938, when a recurrent infection was located near Alvin.

CONTROL INVESTIGATIONS

Toxicity to housefly of optically active and inactive compounds of rotenone series.--A study was made on the toxicity to the housefly of optically active and inactive compounds of the rotenone series by W. N. Sullivan, of this Division, and L. D. Goodhue and H. L. Haller, of the Division of Insecticide Investigations. The materials prepared and tested were racemic deguelin, racemic dihydrodeguelin, levo-beta-dihydrorotenone, levo-dihydrodeguelin, levo deguelin concentrate, levo dihydrorotenone, and rotenone.

To determine the effect of the solvent on mortality, these preparations were tested as acetone and kerosene-cyclohexanone sprays. Of the acetone sprays, that containing rotenone was the most toxic. The optically active substances, levo dihydrorotenone, levo deguelin concentrate, levo dihydrodeguelin, and levo-beta-dihydrorotenone were somewhat less toxic than rotenone. However, racemic deguelin and dihydrodeguelin were markedly less toxic than the corresponding levo forms. Also, the dihydro derivatives of rotenone and deguelin were less toxic than the parent compounds. The kerosene-cyclohexanone solvent gave similar results with but one important exception. Levo deguelin concentrate and levo-dihydrodeguelin were markedly more toxic than the racemic forms when acetone was the solvent, but they were of about the same toxicity when kerosene-cyclohexanone was the solvent. These results again point out that in order that any good insecticidal possibility may not be overlooked, a number of methods and variations of the same method should be used.

Knocked-down houseflies found more resistant to fly spray.--At the summer meeting of the National Association of Insecticide and Disinfectant Manufacturers in New York on June 5, E. R. McGovran, W. N. Sullivan, and G. L. Phillips reported that houseflies (*Musca domestica* L.) that had been knocked down (paralyzed) with ether, acetone, or kerosene sprays low in pyrethrin content (0.5 mg. per cc.) were more resistant to kerosene sprays high in pyrethrin content (2.0 or 4.0 mg. per cc.) than were normal, active flies. The tests were made by the turntable method. The flies were knocked down by an acetone or pyrethrin-kerosene spray or ether vapor during a 10-minute exposure in the spray cylinders. The flies were next exposed to the atmosphere in the laboratory for 5 minutes and then resprayed. Higher mortalities were obtained where the 2 mg. of pyrethrins per cc. of kerosene spray was applied to the normally active flies, followed by a 0.5 mg. per cc. of spray than where these same sprays were applied in reverse sequence. These results indicate that to use the insecticidal constituents of a kerosene-pyrethrin fly spray most efficiently in fly control the insects should receive a lethal dose of the spray before being knocked down.

INSECTICIDE INVESTIGATIONS

Nicotine on apples.--The increasing importance of tank-mix nicotine bentonite in the control of codling moth has drawn attention to the question of nicotine residues on apples. L. N. Markwood has just published in the Journal of the Association of Official Agricultural Chemists (v. 22, No. 2, May 1939) a procedure permitting the determination of the nicotine on a single apple, which will make the studies of distribution and permanence of nicotine as simple as those of lead and arsenic have become. The method employs a color reaction between nicotine and a mixture of cyanogen bromide with beta-naphthylamine, the red color developed being measured in a suitable photometer.

Basic copper arsenate.--The Journal of Economic Entomology for February 1939 (v. 32, No. 1, p. 142) carried an article entitled, "Basic Copper Arsenate--A New Insecticide," by E. D. Witman, H. A. Waters, and E. F. Almy. The authors described the material as being a definite chemical compound of the formula $4CuO.As_2O_5.H_2O$. The Division of Insecticide Investigations has recently analyzed for various field stations four samples of this material, and it is felt that other stations may be interested in our findings. The results of our analyses of the samples as received are given in the table, in comparison with the theoretical figures.

Results of analyses	Cupric oxide (CuO)	Total arsenic oxide (As_2O_5)	Molecular ratio CuO/As_2O_5	Water soluble As_2O_5
	Percent	Percent		
Theory-----	56.21	40.61	4.00	--
Found------	53.5	38.4	4.03	0.01
Do-------	53.5	38.6	4.01	.01
Do-------	54.5	38.5	4.09	.10
Do-------	54.7	38.7	4.09	.06

It is evident that the commercially produced material is quite close to the composition claimed by the manufacturer. The water-soluble figures quoted were obtained by the method of the Association of Official Agricultural Chemists, using 2 grams of material per liter, and hence are equivalent to 0.2 to 2.0 milligrams per liter, as compared with the 3 milligrams per liter quoted in the article cited.

BEE CULTURE

Bees quickly separate pollen from honey in honey sac.--An experiment conducted at the Bee Culture laboratory in Davis, Calif., on giving bees pollen mixed in liquid honey gave results contrary to those anticipated, inasmuch as no brood was reared to maturity when bees were thus fed. Frank E. Todd, in charge of the laboratory, reports as follows regarding the colony used in the experiment: "No feeding was made during the first 10 days and no egg laying occurred. Then pollen in liquid honey was fed and within 3 days egg laying began in what appeared to be a normal manner, the area expanding in proportion to the bee force present. The eggs hatched in 3 days, but although eggs and young larvae were numerous, older larvae did not appear, nor sealed brood. The colony was fed pollen in liquid honey for 18 days, but no larvae reached sealed stage until dry pollen was fed the colony. During this feeding period most of the brood (63 percent) died in the larval stage. The greatest mortality (31 percent) occurred between the second and third days, when the food of larvae is normally changed from royal jelly to honey-pollen. It appeared that the larvae were not receiving the pollen, although it was being fed to the colony. The colony was next given a comb containing pollen, which had been powdered from pellets trapped earlier in the year and air-dried. An improvement in the efficiency of brood rearing occurred at once. The larvae appeared better fed and a larger percentage (29 percent) were carried through to sealing and maturity. The length of life was considerably increased on this type of food. Then followed the period when fresh pollen from the field came in noticeable quantity and brood rearing efficiency again increased to somewhat near normal (77 percent). The conditions observed here in detail were similar to those observed in the colonies in the apiary where similar feeding was done. It is concluded that pollen fed in liquid honey in the absence of a pollen reserve gives negative results in brood rearing. The reasons for these negative results were not at first apparent. It was noted that the yellow liquid fed did not appear stored in the combs, but instead the stored honey was clear. Some of the pollen was then dyed with brilliant green, a specific dye for pollen but not for sugar. Of the 1,161 cells stored and checked, green color appeared in only 7 cells (0.6 percent) as apparent to the naked eye. Microscopic examination showed a few dyed pollen grains present in these apparently clear cells of honey, which identified their source. Comparative counts have not yet been made, but examination showed that the amount of pollen was greatly reduced during transport from feeder to storage cell. Bees feeding on the dyed material showed relatively clear honey in the honey sac and dyed pollen grains in abundance in the ventriculus, small intestines, and hind intestines in the manner described excellently by Whitcomb and Wilson (Wis. Research Bul. No. 92, 1929), which showed the rapid and selective action of the pro-ventriculus. This seems uncanny. That bees could not carry this pollen from the feeder to the starving larvae, because of its action, is hard to believe but this appears to be the reason for the negative results obtained in these feeding tests. The problem of how bees do carry pollen to the larvae remains to be solved. It may have a bearing on why pollen reserves some distance from the brood are apparently not utilized efficiently."

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Incorrect scientific name applied to raspberry fruitworm.--The raspberry fruitworm, long supposedly well known under the name *Byturus unicolor* Say, appears to be not that native American species, whose real habits remain unknown, but one of the exotic forms whose introduction and spread from the Atlantic to the Pacific seems to have escaped our notice until now. The inadequate samples available suggest that a second, and perhaps even a third, exotic species may have become established in this country but the taxonomy of this small group, which is in no respect part of the Dermestidae as commonly stated, is very much confused. The species are very similar in appearance, although their habits may be very dissimilar. If samples, preferably alcoholic, are preserved in field stations, their examination in the Insect Identification Division at this time would be opportune. Especially needed are samples which might suggest the host plants or habits of our several native species. Pin labels "ex galls on oak" and "reared Monterey cypress" on available specimens suggest varied habits which should be verified because preparatorial errors in deciphering note numbers sometimes produce very misleading records.

A new generic name for the tomato pinworm.--In a recently published paper by August Busck (Proc. U. S. Nat. Mus., v. 86, pp. 563-593, 1939), restricting the concept of the genus *Gelechia* Hubner and treating the American species that have been referred to that genus and to *Gnorimoschema* Busck, 7 new genera are erected and 5 older generic names removed from synonymy. All but 17 of the species formerly listed under *Gelechia* are referred to other genera; and 4 species (*lycopersicella* Busck, *glochinella* Zeller, *elmorei* Keifer, and *altisolani* Keifer) are transferred from *Gnorimoschema* to the new genus *Keiferia*. The new combination for the pinworm is, therefore, *Keiferia lycopersicella* (Busck). The potato tuber moth (*operculella* Zeller) still remains in *Gnorimoschema*.

A parasite of the furniture carpet beetle.--Twenty specimens of a bethylid parasite, determined as a new species of *Laelius*, were submitted by E. A. Back, who had reared them from the furniture carpet beetle *Anthrenus* *vorax* Waterh. This appears to be the first record of the rearing of a parasite from that pest.

Outdoor roaches infesting houses.--Each spring specimens of normally outdoor-dwelling roaches are submitted for identification, following their capture in houses. The species most often entering houses from the outside is *Parcoblatta pennsylvanica* (Deg.). This species ranges over much of the eastern half of the country, but in houses is most often found in the Northeast or about the Great Lakes. Recently a specimen of *Parcoblatta virginica* (Brunner) was collected in a house at Arlington, Va. These native roaches normally live beneath loose bark, about decaying stumps and logs, or in other favorable woodland situations, but fly actively to lights in considerable numbers and occasionally enter houses. The wings of the females of most species of *Parcoblatta* are not sufficiently long to permit sustained flight, so that the males are most often encountered in homes. The species do not ordinarily become thoroughly established.

The author of the scientific name for the citrus whitefly.--Inquiries have been received from various sources concerning the author of the name *Dialeurodes citri*. This is because in some of the literature dealing with the citrus whitefly Ashmead is cited as the author, while in other publications the name is ascribed to Riley and Howard. In 1883, Ashmead described *Aleurodes citri* in the Florida Dispatch (v. 2, No. 42, p. 704). Riley and Howard redescribed the species in 1893 in Insect Life (v. 5, pp. 219-226), and for years afterwards these authors were usually credited with the name. Although this error was noted by Quaintance and Baker in 1917 (U. S. Nat. Museum Proc., v. 51, No. 2156, p. 408), Riley and Howard have since been quoted occasionally as the authors of *citri*. The correct, complete citation of Ashmead's description apparently had not been mentioned until 1932, when Essig reprinted the complete description (Jour. Econ. Ent. v. 25, No. 6, pp. 1207, 1208) as copied from the Florida Dispatch of November 12, 1883. Since *citri* has been transferred from the genus *Aleyrodes* the correct combination for the citrus whitefly is *Dialeurodes citri* (Ashm.).

An addition to the collection of Lepidoptera.--Through the kindness of Mrs. Ely, the collection of Microlepidoptera of the late Charles R. Ely has been donated to the National Museum. The collection consists of about 3,000 specimens and includes paratypes of several species described by Dr. Ely.

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